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Collins Co. Rehabilitates Plant to Reduce Costs and Re-Align Production

The A. M. Collins Manufacturing Company, of Philadelphia, will complete, during 1939, the rehabilitation of the plant at 226 West Columbia Avenue. This program was started in 1937 and has been carried on slowly over the last two years. This program was undertaken with the idea of reducing costs, reducing the amount of floor space occupied, and realigning the production, to obtain a more uniform flow of material through the plant. When the program was first considered, a check-up showed a number of departments located in places a considerable distance from where the product was next used. There was no continuous line of production. The resultant cost for transferring material from one department to another was very high. It was decided to undertake a step by step change-over, in order that no interruption in production could take place.

Casein Mixing Dept. Transferred

The first step was the transfer of the casein mixing department to a location alongside the clay mixers. The work included putting in a cement floor, transfer of the tanks, and necessary drive. This work was completed without interruption to the manufacturing schedule.

New 56-Inch Calender Installed

The second step was the erection of a new 56 inch calender, complete with electric drive, on the first floor of the building. The job was done completely by the maintenance department, including the electric drive, made by the Monitor Controller Company, of Baltimore, and necessary foundation, which required over 30 tons of concrete.

New Finishing Room

The third step was the building of a new finishing room on the first floor, so that all finishing operations, with the exception of pasting, now take place on one floor. This involved moving the trimmers and sheeters, weighing, in all, approximately 100 tons, from the third floor to the first floor, and bracing the foundation. This job was handled completely by the maintenance crew.

New Boiler Installed

The most important and largest job was the erection of a new boiler, to handle the steam problem. The existing plant consisted of six HRT boilers of approximately 100 hp. apiece, hand-fired, and situated in a boiler house with very low head room. The requirements for steam had increased to such an extent that an immediate change was necessary. The problem was complicated further by the fact that beams supporting the roof of the boiler house only permitted about 16 feet head room.

After investigating all the low-head boilers available, it was finally decided to install a Riley Type RO boiler, complete with a water-cool wall, and to make the installation complete by changing over to oil burner.

Work Done in Short Space of Time

The existing power plant was unable to handle the load in the winter time with any leeway. Therefore, it became necessary for all work to be done in a very short space of time during the summer, when the heating load was lightest. Contracts were entered during the latter part of June for the demolition of two of the old boilers and the erection of the new boiler plant. The new boiler, at 150 per cent rating, is guaranteed to handle the entire plant requirements, with sufficient reserve to take care of any normal increase at present contemplated. The Riley RO boiler is the miniature of some of the largest installations, carrying out all the features of modern power plant design, including a water-cool wall, high rate of heat recovery, and built-in economizer. It is assumed, at least, on the company's engineers' report, that the plant will pay for itself in fuel and labor saving in approximately two years.

Boiler Equipment

The boiler will be fired by two Faber Engineering Company's burners and will be governed by fully automatic control, including Cope's feed water regulator, Brookes Engineering Company's combustion, and load regulators on the burners. One of the deciding facts in the selection of the Riley was the beauty of the design and the accessibility, should repairs become necessary. The boiler was completed about the middle of October, and was placed in operation about the first of November. Future plans call for the installation of a duplicate of this boiler, to

take the place of the four HRT's remaining, which are held, temporarily, as a stand-by.

Economical Operation

The new power plant will permit economical 24-hour operation of all departments and, by reason of the extreme flexibility of the combustion controls and load regulators, handle the varying loads without excess cost. The installation will, also, cut labor costs for coal and ash handling considerably. The entire program was carried through without any interruption to the manufacturing schedules, and the management feel that the results already shown have more than repaid them for the care taken in the planning of the various moves.

The final step in the 1939 program was the installation of one 68 inch and one 44 inch embossing frames, electrically driven, to increase the flexibility of the finishing department.

All this work was carried out under the direction of Lew Hillegas, master mechanic, who has recently celebrated his thirtieth anniversary as foreman in the A. M. Collins Manufacturing Company's plant.

VIEW IN NEW FINISHING ROOM.

Coastal Empire Paper Festival

"The Last Border" has been an expression used in many industries. We have read of the "last border" in the cattle and sheep industry, the mining industry and now we find it being expressed in the paper industry. When the South is mentioned the average mind immediately pictures a land of cotton, tobacco and Southern belles. Few picture it as a "last border" in the paper industry. Yet, that is what the South really is proving itself to be.

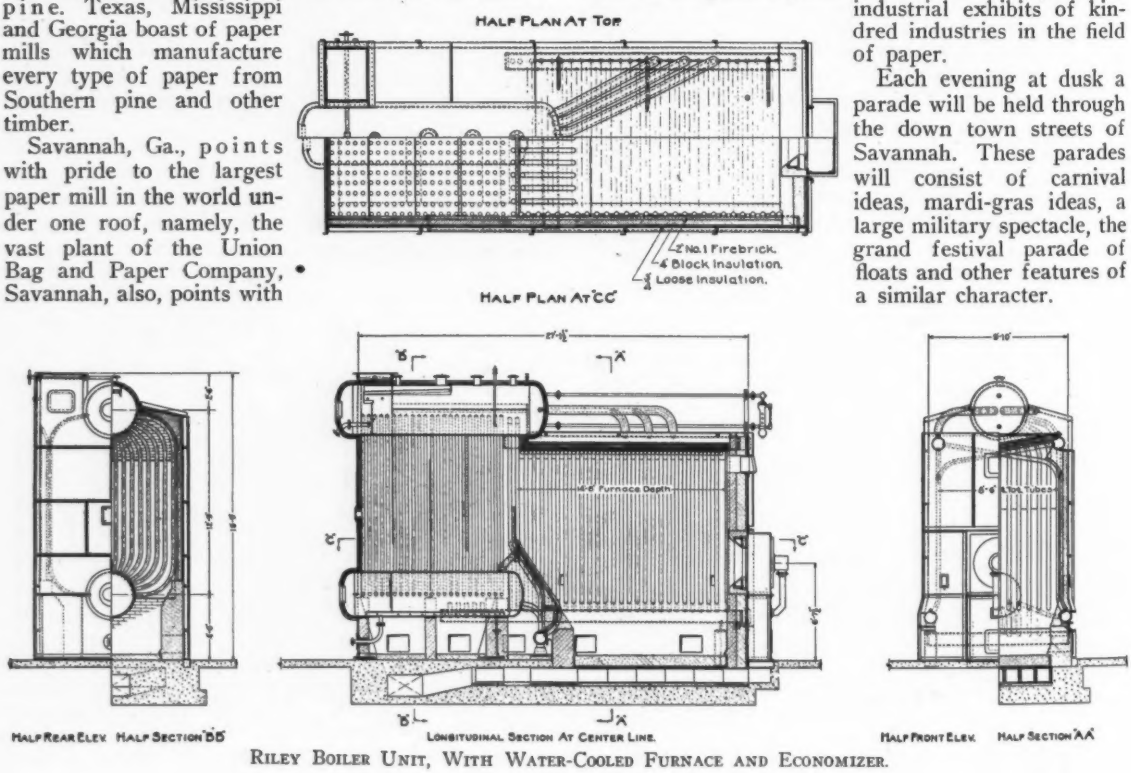
Admiral Byrd is carrying with him to the Antarctic pre fabricated houses made of lone leaf Southern pine. Texas, Mississippi and Georgia boast of paper mills which manufacture every type of paper from Southern pine and other timber.

Savannah, Ga., points with pride to the largest paper mill in the world under one roof, namely, the vast plant of the Union Bag and Paper Company, Savannah, also, points with pride to one of America's outstanding research laboratories in the research of new uses for Southern pine, namely the Herty Foundation Laboratory.

Paying homage to "King Papryus" Savannah Paper Festival, Inc., is staging in Savannah, April 1 to 6, 1940, the Coastal Empire Paper Festival. Named the "Coastal Empire Paper Festival" to convey the idea to the world at large of the enture "Coastal Empire" which contains the coast line of South Carolina, Georgia and Florida and a territory extending inland about 150 miles from the Atlantic coast line in these three states.

The 1940 festival in honor of paper will be an event that combines exposition ideas with the carnival spirit. The Savannah City Auditorium will be used as an exhibit hall with its doors thrown open free to the general public and here will be quartered industrial exhibits of kindred industries in the field of paper.

Each evening at dusk a parade will be held through the down town streets of Savannah. These parades will consist of carnival ideas, mardi-gras ideas, a large military spectacle, the grand festival parade of floats and other features of a similar character.


HALF PLAN AT TOP
2" No.1 Firebrick.
6" Block Insulation.
Loose Insulation.
HALF PLAN AT 'CC'
HALF REAR ELEV. HALF SECTION 'BB'
LONGITUDINAL SECTION AT CENTER LINE.
HALF FRONT ELEV. HALF SECTION 'AA'

RILEY BOILER UNIT, WITH WATER-COOLED FURNACE AND ECONOMIZER.

Ohio Waxed Paper Co. Builds Mill To Make Its Own Paper At Columbus, Ohio

Early in 1939 the Ohio Wax Paper Company, of Columbus, Ohio, a large manufacturer of bread-wraps, decided to enter into the manufacture of waxing paper for its own use. Its converting business had grown to a point where it felt it was justified in having a paper mill of its own to insure a constant supply of uniform quality, and at a cost which it was convinced would at least be no higher than it could purchase its paper for on the open market. Wishing to keep the investment in its first unit to a minimum it gave serious consideration to the purchase of used equipment, but after several months of careful investigation abandoned this idea almost completely with the result that except for certain parts of the paper machine and the steam turbine everything else is new machinery. Such equipment as was purchased as used machinery was thoroughly overhauled before being installed in its new location.

Several Unique Features

The plant is strictly a converting mill in that all its raw materials for the manufacture of paper will be purchased and contracts have already been made for a supply of chemical pulp for the coming year. The capacity of the plant will be from 16 to 20 tons on weights varying from 18 lb. to 24 lb. paper and will supply the entire requirements of the waxing plant at its present output. There are several unique features about this plant. It is not located near a stream of any kind and therefore the builders had the problem of water supply and waste disposal to contend with. These problems were solved by sinking of wells for water on the property and the disposal of waste process water to the city sewer and cooling water for the turbine condenser back into the ground through a disposal well sunk to a depth of about 150 feet below the strata from which the fresh water supply is taken. This seems to be common practice in and around Columbus for cooling plants for air conditioning as the city does not want this large excess volume of water to go to its treating plant.

Adequate Water Supply

The water supply for this plant is provided by two wells approximately 100 feet deep located inside of the building supplying 1,350 gallons per minute of cold water at a temperature of 54 degrees, which is very desirable for the grade of paper to be made. The raw water however contains iron to a detrimental degree for white papers and an iron removal plant has been installed for this purpose. The waste process water will be disposed of through the city sewer and will have to be kept to a minimum because of its character and the additional reason given above. The plant itself is located just outside the city limits in Franklin County, while the present converting plant is in the city about 200 feet away across Frebis avenue to the North. Finished paper will be trucked from one plant to the other by the companies own trucks.

A very thorough investigation as to water supply on this property was made a year ago by Mr. Palmer, president of the company and he was fully convinced of its availibility before giving any consideration to the establishment of a paper mill on the site. The site covers several acres of level land with access to railroad conveniences both on the site and adjacent thereto. It was necessary to build a new side track only a couple hundred feet long to serve the plant for incoming shipments of pulp and other supplies.

Buildings of the Plant

The plant consist of two main buildings for the most part one story high with the main floor at car floor level. The manufacturing building consists of one structure 42 feet wide and 395 feet long running north and south with the southern end divided by cross walls forming the boiler house, the steam turbine room and a filter plant, leaving the balance of this building for the beater room and machine room. Adjacent to this on the west side is a store room 33 feet by 310 feet long for storage of pulp supplies and finished stock. The height of the roof truss throughout is 16 feet and the roof is built on saw-tooth pattern with windows on the east side extending for the height of the truss at the high side. The east wall at the drive side of the paper machine is largely filled in with glass blocks.

The walls are hollow concrete block made at a site within a few hundred feet of this plant. All the footings are of concrete, but the walls from the footings to the main floor are of hollow concrete blocks filled with concrete in which are embedded vertical iron bars making a solid substantial wall of minimum thickness. Very little form work was required in and around any of the building walls.

The roof is supported on steel trusses of saw-tooth design on 15 feet—6 inch centers and covered with 2 inch D and M plank and a 15-year Johns-Mansville built up roof, except for the turbine room and boiler house, which are covered with fire-proof material. The buildings are so arranged that if and when it is decided to add another paper machine it can be done on the west side adjoining the store room, which will act in that capacity for the enlarged mill.

There is a basement 12 feet high in the turbine room and a partial basement in the machine and beater room. This basement is for housing of stuff chests, white water, fresh water pumps, etc.

Ideas Based on Long Experience

Mr. Palmer assumed active charge of the supervision of the construction work and many of the ideas carried out in this line are due to his past experience and knowledge of such work with the result that a large amount of construction work was accomplished at a relatively low cost. There was no general contractor on the job, but various parcels of work were let by contract as they were ready and it was not necessary to have a large crew of workmen on hand at all times nor any considerable amount of contractors equipment. All the concrete was furnished ready mixed as needed.

The machine track walls and stuff and water chests together with the main floor are all concrete, most of which is reinforced. The main building is largely open and straight, so that a man standing at one end can see all that is going on from one point. At the north end of the machine room there is an office and laboratory and restroom for workmen.

Equipment for the New Mill

The following equipment is being installed for the first unit, some of which is of sufficient capacity to take care of another paper machine of the same size as is now being installed:—

The boiler plant includes a coal handling plant furnished by the Jeffrey Manufacturing Company with unloading equipment, and a bunker capable of holding 105 tons of coal. This will do also for a second machine. The boiler is an R. O. Unit of 1,000 hp., 250 lbs. pressure, 100 degrees superheat, by the Riley Stoker Company of Worcester, Mass., with a twin retort Jones stoker, forced draft and induced draft fans and a steel stack 100 feet high. Boiler feed pumps, one motor driven and one turbine driven were furnished by the Worthington Pump and Machinery Company. Feed water heater by the Swarthout Company. Steam turbine 750 KW by the General Electric Company, bleeder condensing type. Condenser by the Ross Heater and Manufacturing Company, of Buffalo, N. Y. Switchboard by General Electric Company, and the Electric Power and Equipment Company, through the Columbus office.

All electrical wiring and other electrical accessories by the Electric Power and Equipment Company of Columbus. Water softening plant by the International Filter Company, of Chicago. Iron removal plant by the International Filter Company, of Chicago. Wooden retention tank and tile linings for chests by the Kalamazoo Tank and Silo Company, of Kalamazoo, Mich. Filtering plant piping and steam piping by Lieb & Jackson, Columbus. Lieb & Jackson also supplied as agents the Swarthout heater and other boiler plant appliances and the Deming stuff pumps. Beaters were furnished by the J. H. Horne & Sons Company, and consist of two-2,000-lb. high speed wood tub, concrete bottom beaters with washers. Two No. 2 Jordans with Westinghouse 150 hp. synchronous direct connected motors were furnished by the Appleton Machine Company, Appleton, Wis., who also furnished the agitators. Beaters will be belt driven by 100 hp. General Electric motors. Save-all by Bird Machine Company, latest type. Screen by Bird Machine Company, non-ferrous, driven by direct connected motors.

The Paper Machine

The paper machine is made up of partly used and new equipment and was furnished by the F. H. Davis Company of Cambridge, Mass., with the assistance of J. H. Horne & Sons of Lawrence, Mass. It consists of a 60 foot by 90 inch wire, a suction couch, Horne shake, a suction first press and two additional presses, with two Nash vacuum pumps, a drier section of 22-48 inches by 90 inches driers and two felt driers, a nine roll stack of calenders, two bowl reel and two drum winder. The equipment includes Vickery Doctors on the calenders, super calenders and breast rolls. All the drives are new and were furnished by J. H. Horne & Sons Company and all felt and wire rolls are in ball bearings. The driers have new gears and Johnson steam joints. The machine will be driven by overhead variable line shaft driven by a variable speed steam turbine of 165 hp., built by Murray Iron Works, Burlington, Iowa, mounted in the shaft by flexible couplings. The line shaft will be carried in pillow blocks on adjustable base plates on a substantial steel harness supported from the floor and will operate at a maximum speed of 400 r.p.m. for a paper speed of 700 feet per minute.

All the constant speed equipment will be direct connected or belted to motors with V belts. All fresh and white water pumps, four in number, were furnished by Economy Pumps, Inc. of Hamilton, Ohio.

The drainage system on the paper machine will be furnished by the Midwest Fulton Machine Company of Dayton, Ohio, and will be equipped with the latest appliances for this purpose. There will be an asbestos board hood over the paper machine with two exhaust fans discharging through the roof. There will also be a heating plant consisting of unit heaters several of which will be connected to outside atmosphere.

Adjacent to the end of the machine and located in the store room section, there will be a Holyoke Machine Company supercalender of nine rolls driven with a Westinghouse two-motor drive of 125 hp. The supercalender will be used if needed on regular papers, but will also be available for special papers. Such motors as are not provided with individual machines will be furnished through the Electric Power and Equipment Company of Columbus.

A Stream Lined Plant

The plant will be stream-lined throughout, and there will be little if any lost motion in getting the product through this plant from the entry of raw materials to the finished product. It is expected the mill will be in operation shortly after the first of the year. The type and capacity of equipment and the layout all the way through has been given very careful consideration and is the result of the judgment and experience of those responsible for the undertaking. The experience of those in charge of the present waxing plant was very valuable in determining the requirements for the paper plant. Among those who contributed in this manner are, E. Palmer, president of the company, George Schaeffer and Sylvester Staley, and Tom Palmer of Chillicotte, whose advice on the process phase of the project was freely given and was exceedingly valuable.

Walter Cunningham to be Superintendent

Tom Palmer has had a wide experience in the manufacture of the particular class of paper this mill is to make. Walter Cunningham of Dayton, Ohio has been engaged as general superintendent, and will take up his duties in the near future.

New England Paper Men Win

CHESTER, Pa., November 27, 1939—New England wholesalers stood at the top in the contest in connection with the national campaign, "The Big Game Hunt," conducted by the Scott Paper Company for the purpose of getting new accounts. When the campaign was first announced about October 1, many said that nothing could be accomplished, due to conditions abroad, but it was highly successful. Considerable money was offered in prizes.

National Container Corp. Is Latest of Great Kraft Mills to Start

Among the several kraft pulp and paper mills erected in the South in the past few years, the latest to start operations is the mill of the National Container Corporation in Jacksonville, Fla.

Johnson & Wierk, Inc., were the consulting engineers and Merritt-Chapman & Scott Corporation were the general contractors for the construction, which was completed in seven months, with the cooperation of the operating officials of the National Container Corporation.

Unusual Problems Solved

Viewed from any angle, the plant shows evidence of numerous unusual layout and construction problems introduced by the fact that, in large extent, buildings previously existing on the site were used in a fashion dictated by careful study of numerous preliminary layouts made prior to construction.

KRAFT MILL OF NATIONAL CONTAINER CORP.

The wood supply for this mill is Southern pine, cut from forests within a comparatively short radius from Jacksonville. This wood is received by the mill in five-foot lengths, unbarked. The preference is for logs between four and twelve inches in diameter; and "catfaces" (the sections of trees scarred for turpentine operations) are generally unacceptable because they usually carry nails left by the naval stores operation, along with heavy gum deposits which also include much sand and other dirt.

Although the future possibility of receiving barge deliveries of wood was not overlooked, equipment for handling such deliveries was not installed and the mill has been consuming only such wood as is delivered by motor-truck and railroad from a comparatively short radius from the mill.

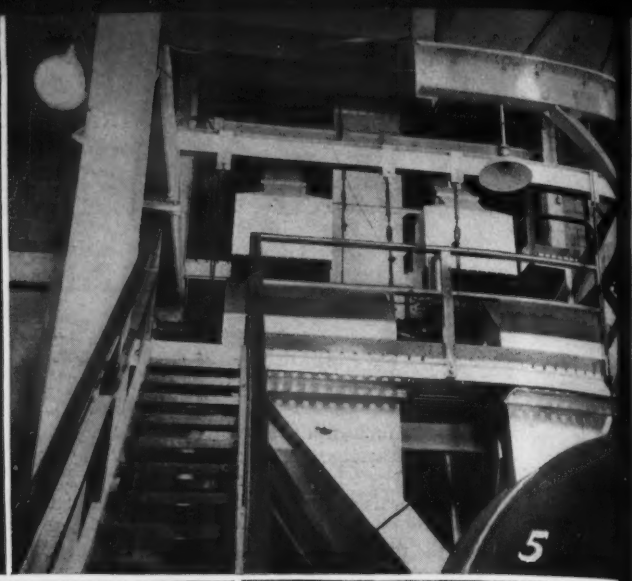
Wood-Yard Equipment

For numerous reasons mill-yard storage of large quantities of Southern pine pulpwood is undesirable, and wood-yard equipment differs materially from that employed in Northern mills. Pulpwood is delivered to the mill by either motor-truck or railroad. Occasionally the wood as received is thrown directly into the main log-haul which feeds the barking drum, but in order to keep the yard filled with the maximum permissible quantity of fresh wood a considerable amount of incoming wood goes into yard storage and then, at a later date, into the log-haul. The log handling equipment was manufactured by Jeffrey Manufacturing Company. Fig. 1 is a general view of the wood yard showing the arrival of a fleet of wood-laden trucks. The main log haul is between the railroad cars and the stacked logs while the barking drum is at the right hand end of the large building.

Since all wood is received unbarked, the log-haul from the yard discharges exclusively to the barking drum, which in this case is 12 feet in diameter by 45 feet long. It is of a novel design and was, so far as is known, the first of its type, having been made by Carthage Machine Works. The drum proper was completly fabricated in place by electric arc welding. From the standpoint of barking action it left nothing to be desired, although some structural weaknesses called for subsequent reinforcements. Objection to noise on the part of adjacent community compelled the subsequent erection of a sound-proof house to enclose the barking drums. Fig. 2 shows this barking drum before the sound-proof house was erected around it.

Log Conveyors

The barked logs are conveyed on the conveyor shown in Fig. 3 to an 88 inch Carthage chipper, driven directly by a synchronous motor. To the right of this log-haul, on the ground, may be observed a covered conveyor which takes the bark into the wood room where it joins with the wood room refuse. Fig. 4 shows the feed end of the chipper. The chips are conveyed and elevated to a pair of 5 foot by 12 foot Tyler "Niagara" inclined shaking screens which separate the over- and under-size from the acceptable chips. The arrangement of these screens is shown in Fig. 5. The oversize wood particles are reduced in size in a Lombard chip crusher, the output of which is fed back to the chipper discharge for rescreening. The acceptable chips from the screens are handled by Jeffrey belt conveyors to the elevated chip bin over the digesters. Undersize chips (sawdust, as they are called) are combined with the barking drum



INSTALLATIONS IN MILL OF NATIONAL CONTAINER CORP.

JACKSONVILLE, FLA.

14. DILTS Broke Beater in Basement at Dry End of Machine.

2. Barking Drum Fabricated in Place by Arc Welding by CARTHAGE MACHINE WORKS.

6. Knife Grinder Made by BRIDGEPORT SAFETY EMERY WHEEL CO.

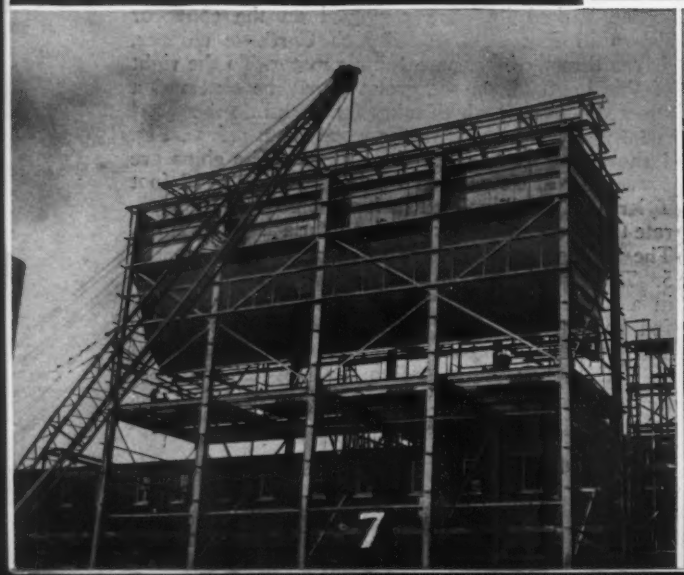
7. 30,000 Cu. Ft. Capacity Chip Bin Shown in Course of Construction.

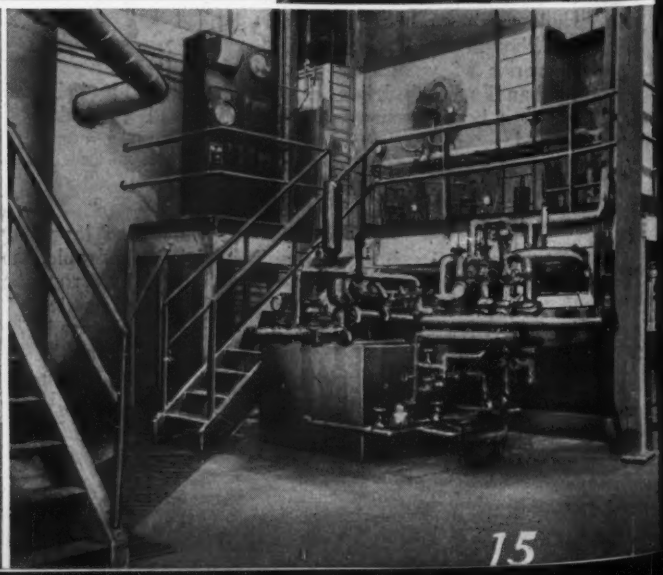
5. Arrangement of 5 x 12 Ft. TYLER "Niagara" Inclined Shaking Screens.

3. Barked Logs Carried by Conveyor Made by JEFFREY MFG. CO.

15. Burner Side of BABCOCK & WILCOX Oil-Fired Boiler.

See Text for Additional Descriptive Matter.





refuse and delivered by belt conveyors to the fuel bin of the refuse burning boiler in the boiler house.

The Bridgeport Safety Emery Wheel Company furnished a knife grinder which serves the chipper knives and which is shown in Fig. 6.

The accepted chips are stored over the digesters in a 30,000 cubic foot catenary chip bin into which the incoming chips are distributed by a drag chain with selective drop-slides by which chips may be dropped into the bin where desired. Fig. 7 shows this chip bin under construction.

Four 3000 Cubic Foot Digesters

The four 3000 cubic foot digesters, of Class I all-welded construction, were made by Foster-Wheeler and were equipped with indirect liquor heaters.

To control cooking and relief and also to accommodate selective choice of either high or low pressure steam for cooking, Taylor instruments, of suitable type and in proper combination, were installed. By these instruments each cook is started with 30 lbs. steam to increase the electric output from the main turbo-generator set, and also to somewhat decrease steam consumption by reason of the greater latent heat content of the lower pressure steam. When the cook reaches a predetermined temperature, the instruments automatically shift that cook from 30 lbs. to 130 lbs. steam which is then used for the balance of the cook with steam control based on cooking temperature. Relief of "false" pressure related to gases other than water vapor in the digester is accommodated by a combination instrument which automatically opens the relief valve when the pressure in the digester exceeds the water-vapor pressure corresponding to the temperature of the cook.

The cooked chips are blown from the digester through tandem "lift-and-drop" plug type Crane Company blow valves to a large steel agitated blow tank from which the flash-steam is condensed to conserve heat energy in the form of hot water for washing and other mill uses.

Minimizing Relief Odors

To minimize relief odors a surface condenser was installed but no turpentine refining apparatus was included when the mill was built, for the reason that the economics of turpentine sale in a "naval stores" district seemed to be doubtful at the time.

As the blown pulp is removed from the blow tank at a consistency controlled by back-feed of black liquor, it is handled by a Warren "flat-head-curve" pump which delivers it to the wash house.

Washing of the pulp is accomplished on three 8 x 12 feet Improved vacuum washers arranged in tandem for counter-current washing. The wash house arrangement is very compact as a result of ultilization of existing buildings. Fig. 8 is a close-up view of the drive end of the second stage washer looking toward the third stage washer in the background. The wash liquor on this second stage, as on the first stage, is applied by weir arrangements while sprays are used to apply the hot water wash on the third washer. The action of these washers, however, involves minimum chemical losses, minimum fresh water consumption, and maximum strength of liquor going to the evaporators.

The effluent of the first vacuum washer representing the highest strength black liquor is further concentrated in a Goslin-Birmingham quintuple effect, five-body climbing-film type vacuum evaporator. For counter flow operation of the five bodies, LaBour pumps and Fisher controls are provided. Vacuum is provided by a Byers barometric condenser which is supplied with river water.

Murray-Waern Recovery Units

The concentrated liquor from the evaporator is further dehydrated in the disc evaporators or scrubbers of two Murray-Waern recovery units installed by the Combustion Engineering Corporation. The scrubbers also remove some heat energy and some suspended solids from the stack gases as they leave the recovery unit. From the scrubbers the concentrated black liquor is fed to the rotary kilns for incineration, the residue of which is reduced in the smelters, from which the molten sodium carbonate (with the sulphides, of course) flows by gravity into the dissolving tanks to form the strong dirty green liquor. Fig. 9 shows the steam drum above the top of the smelter furnace with the incinerating kiln at the left. The main portion of the smelter is below the operating floors from which this picture was taken.

The green liquor is causticized in equipment furnished by The Mount Chemical Equipment Company and the Dorr Company which includes a pair of green liquor decanters with dregs washers, a slaker, and a pair of causticizers, a pair of caustic liquor decanters, a sludge feed tank, and a pair of vacuum mud filters which are arranged in tandem for counter current operation. The lime mud from the filters is reburned to quicklime in a 9 foot x 135 foot Vulcan kiln which is fired by oil. Fig. 10 is a view taken during construction looking at the firing end of the kiln. In the background can be seen the house protecting the mud filters, in back of which is the stack which serves the kiln; while to the right of the kiln are the four conical bottomed decanters, the two nearest of which accommodate green liquor while the pair in the background handle white liquor.

A conveniently located storage bin was provided to accommodate a supply of quicklime for make-up to the system.

Pulp Mill Yard Equipment

The pulp mill yard includes tanks for the storage of the various liquors as well as a sizeable hot water tank and a storage tank for fuel oil.

Retracing our steps to the wash house we find that the washed pulp from the third washer is dropped into a sizeable chest with propeller agitators from which it is pumped to the stuff preparation department where the equipment includes three No. 4 Improved centrifugal screens set up in combination with an 8 foot x 10 foot Improved vacuum thickener. Rejects from the centrifugal screens are rescreened on a 14-plate flat-plate reject screen, the rejects from which are re-worked in a small refiner. To hydrate and cut the fibers for board manufacture, eight of the latest type Jones Majestic jordans were provided. Four of these jordans are equipped with cutting tackle and four with hydrating tackle. These jordans are shown in Fig. 11. The stuff preparation department includes two sizable chests both equipped with propeller agitators and this department is also equipped with the necessary consistency regulator, size and alum feeders, etc. A P.M.C. sizing system is

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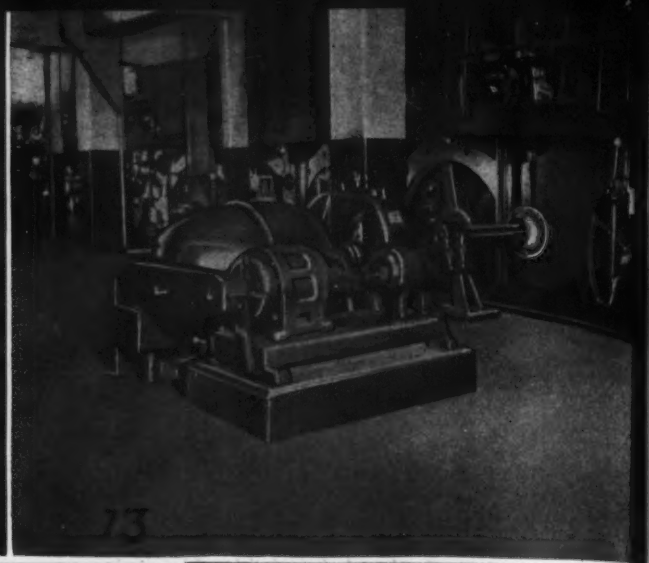

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INSTALLATIONS IN MILL OF NATIONAL CONTAINER CORP. JACKSONVILLE, FLA.

12. Fan Pump Made by GOULDS PUMPS, INC.

13. Master Selsyn of GENERAL ELECTRIC Paper Machine Drive.

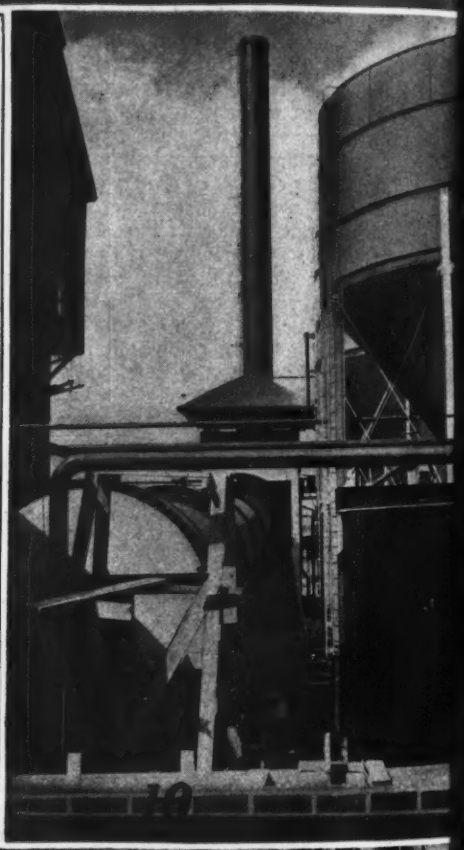
9. Waste Heat Boiler above Smelter Furnace with Incinerating Kiln at Left.

17. End View of Turbine Condenser with Multi-Unit BLACKBURN-SMITH Strainer.

10. End view of Lime Kiln, Showing Lime Mud Filter House and Stack. Causticizing Decanters to the Right.

16. Condenser Circulating Pump Handling River Water and Two Electric and One Steam Driven Boiler Feed Pumps.

See Text for Additional Descriptive Matter.



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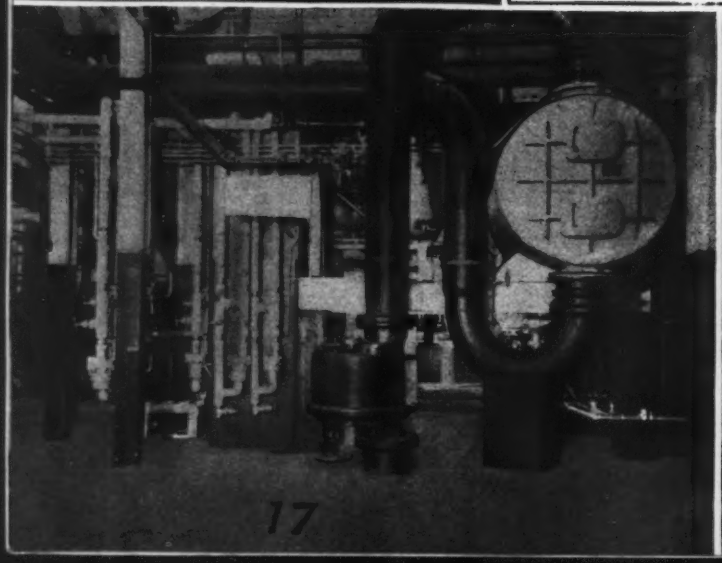

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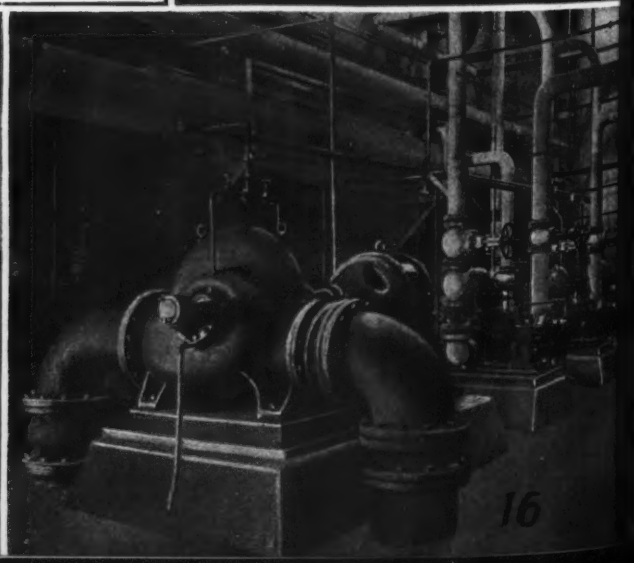


16

included and this is equipped with the necessary tanks, heater, and mixer.

In addition to handling the kraft pulp from the pulp mill the stuff preparation department has been provided with equipment to handle a certain percentage of such suitable waste papers and boards as are locally available.

226 Inch Pusey & Jones Fourdrinier

The production of the plant, being Kraft board ranging from .009 to .030, is made on a 226 inch Fourdrinier machine manufactured by Pusey & Jones Company.

The Fourdrinier part has a 90 foot wire on a removable Fourdrinier. The 40 foot bronze suction couch was made by Downingtown Manufacturing Company. In Fig. 12, in front of a battery of size tanks, may be seen the fan pump which serves the paper machine. It has a capacity of approximately 15,000 gpm and was manufactured by Goulds Pumps Inc.

The two suction presses each have 36 inch rubber covered bottom rolls. The first press top roll is rubber covered while the second press top roll is Stonite, made by Stowe-Woodward, both these top rolls being 30 inches in diameter. All rubber covering on the entire paper machine was done by Stowe-Woodward and it is the writer's belief that the rubber covered suction press rolls on this machine are among the world's largest.

The drier arrangement is typically conventional, with 54-60 inch driers preceded by a 36 inch leading drier and also with 8-48 inch felt driers. There are two top and two bottom felts, the first sections of each having three felt driers each with one felt drier on each of the second sections.

For handling the evaporated moisture from the sheet a Transite drier hood was installed by Walker-Jamar Company, who also installed the six exhaust fans designed to remove from the hood a total amount of 324,000 cfm of air and water vapor.

For the necessary finish 2-8 roll calender stacks are provided after which the run of the machine is handled on a Pope type reel. The board is slit and wound on a two-drum winder built by Pusey & Jones.

The paper machine is equipped with anti-friction bearings throughout, except for the 60 inch driers, which are mounted in sleeve bearings of the latest type. Lubrication of the entire machine is accommodated by a Bowser lubricating system.

Drier Drainage System

The Alpha Steam Specialty Company furnished a drier drainage "system" which includes a Coe Drainator for each drier, a flash tank, a condensate pump, and a vacuum pump which serves the purpose of air and non-condensible gas removal from the system.

To drive the paper machine a General Electric sectional drive was installed. In this case the system included a synchronous motor driving a variable-voltage generator which supplies current for the numerous variable-voltage D.C. motors serving the several sections of the machine. Proper control of the relative speed of adjacent sections on the machine is provided by the conventional General Electric Selsyn system in which each section motor drives its own Selsyn through a variable speed transmission. Each section Selsyn is then, in turn, differentially connected between a master Selsyn and the corresponding section Selsyn on the control board, where any departure of a given section motor from its assigned relative speed is translated into actuation of a carbon-pile rheostat in the field circuit of the section motor in question. In this case the Master Selsyn is definitely related to the section motor driving the first drier section and this portion of the machine, therefore, serves to "mark-time" for the machine as a whole. Fig. 13 shows the Master Selsyn as thus installed.

Dual Motor Winder Drive

To accommodate the winder, there was provided a dual-motor winder-driver with a separate motor-generator set and also a regenerative braking-generator coupled to the unwinding stand.

To handle rolls from the reel to the winder and also to take care of maintenance work, there was provided a 15-ton 5-motor electric crane manufactured by Northern.

To take care of paper machine broke a 64 inch x 54 inch Dilts broke beater was installed in the basement at the dry end of the machine, and this unit may be seen in Fig. 14.

Finished rolls of board are lowered to the basement on a self-supporting elevator arrangement manufactured by Revolvator Company and rolls are handled between this elevator, the roll-storage space, and the out-bound freight cars, by Towmotor gasoline-driven roll handling machines.

After the pulp and paper mill was placed in operation corrugated container manufacturing equipment was installed in some of the remaining space in the large previously existing building.

As in most sulphate mills, a very high percentage of the total steam generated is obtained from the waste heat incidental to chemical recovery and also from the burning of wood-room waste which includes both the bark removed by the barking drum and the "sawdust" from the wood-room.

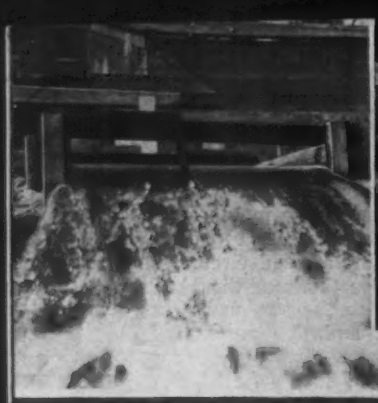
To supplement the steam from these sources a sizeable oil-fired boiler was installed.

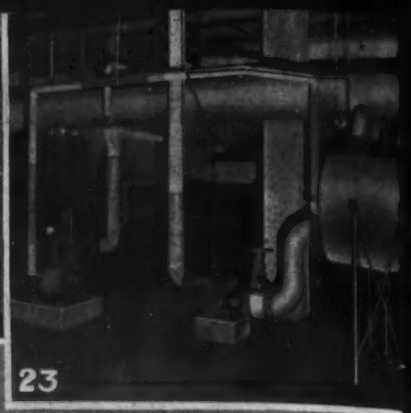
Inasmuch as the generation of steam in the waste heat units is necessarily a "when, as, and if" matter, the fluctuations in demand are accommodated by the oil-fired unit. Since, however, the waste heat boilers are more numerous, the effect of their individual fluctuations is considerably minimized in combination; and the extent of swings observed on the oil-fired unit are not as severe as might have been anticipated.

The bark and wood room refuses are burned in a 30,000 lb. hr. unit which had been initially designed with oil burners in a secondary furnace to accommodate a possible desire to maintain full capacity on the unit even if the refuse fell short of providing the B.t.u. for that purpose. Upon start of operations, however, it was found that the ability of the refuse to generate steam had been considerably underestimated and, without any use of oil, the burning of the refuse developed more than the estimates had involved.

In the chemical recovery plant each of the Murray-Waern units is equipped with a waste-heat boiler between the incinerating kiln and the disc evaporator; and a separately fed boiler is related to each smelter.

The oil-fired boiler, with a rated capacity of 100,000 lb. hr. combined with the other boilers gives a





INSTALLATIONS IN MILL OF NATIONAL CONTAINER CORP. JACKSONVILLE, FLA.

21. Water From Well Installed by LAYNE-ATLANTIC CO.

22. Fourdrinier Section of Paper Machine Supplied by PUSEY & JONES.

23. COE Condensate Receiver and Pumps on Paper Machine Drainage System.

24. All-Welded Rotary Lime Kiln Furnished by the VULCAN IRON WORKS.

25. Model L with Flat Scoop for Roll Handling, Furnished by TOW-MOTOR CO.

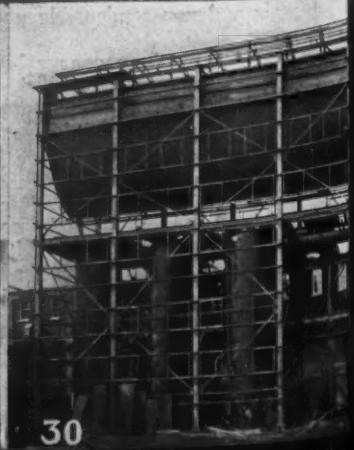
26. BABCOCK & WILCOX Oil-Fired Boiler of "Integral" Design, Including Air Heater and Superheater.

27. Handling Paper Rolls with TOW-MOTOR Truck.

28. MOUNT Lime Sludge Filters Installed by MOUNT CHEMICAL EQUIPMENT CO.

29. General View of 226 Inch PUSEY & JONES Fourdrinier Equipped with COE Drainators.

30. Digester House Framing and Digesters Supplied by FOSTER WHEELER CORP.



total steam generating capacity of approximately 200,000 lb. hr. All this steam is generated at 450 lb. gauge, 700 deg. F. total temperature.

Babcock & Wilcox Oil-Fired Boiler

Babcock & Wilcox built the oil-fired boiler which is of their conventional "integral" design, and which includes air heater and superheater. Fig. 15 shows the burner side of this boiler. On the floor in front of the operating platform are the fuel pumps and heaters; while on the operating platform the control panel is located in convenient relation to the burners. Combustion Engineering Corporation built the bark burning boiler, the waste-heat boilers and the smelter boilers. The Bailey Meter Company provided the necessary combustion controls on all units.

Careful consideration of the chemical aspects of the available water led to the choice of a hot lime-soda treating plant which was provided by Permutit Company. The treating apparatus is arranged to include a deaerating heater built integrally as a section of the softening device, the softener itself, and the necessary filters, chemical feeders, and also a phosphate feeder serving the feed-pump suction line.

250 Foot Reinforced Concrete Stack

To serve the bark burner and the recovery units there is a reinforced concrete stack 250 feet high which was constructed by the Weber Construction Company and for which a very dense and resistant structure was obtained through the use of their "Astocrete" patented concrete mixture. This stack may be observed under construction on the left side of Fig. 7.

A short independent steel stack serves the oil-fired boiler while the lime kiln is served by an independent self-supporting steel stack approximately 100 feet high.

Prior to use in process work, the 450 lb. 700 deg. F steam is passed through a 6,250 KVA General Electric double-bleeder turbo-generator unit. Although in normal operation of the plant it was not expected to develop much energy beyond what is involved with bled steam, the unit is equipped with a Foster-Wheeler surface condenser which aids considerably in improving both governing characteristics and water-rate whenever the unit is called upon to operate independently, as on week-ends or in emergency. Fig. 16 shows in the foreground the circulating pump handling river water for the surface condenser; while in the middle distance are the two electric and one steam driven boiler-feed pumps, with the water treating plant and de-aerating heater in the background. Fig. 17 shows an end view of the surface condenser in the basement under the turbine, with a multi-unit Blackburn-Smith strainer in the river-water line to the condenser. This turbine is arranged to bleed, under control, at both 130 lb. (for final cooking operations in the digesters) and at 30 lb. for the bulk of the process steam requirements.

For economic, and other, reasons prevailing at the time the mill was built, this turbo-generator set operates in parallel with outside power provided by the immediately adjacent municipal electric generating station, owned and operated by the city of Jacksonville. The outside power source supplies such KWH as required beyond the energy involved in the bled steam. Provision, however, was made for the installation of an additional turbo-generator unit should circumstances dictate the advisability of completely independent operation.

General Purpose Motors

The Westinghouse Electric and Manufacturing Company provided the switch-gear and the general purpose motors throughout the mill.

With scattered casual exceptions, motors above 150 hp are synchronous and, to conserve copper, motors 50 hp and over are operated at 2300 volts.

With a few exceptions, some of which have been noted, most pumps were built by Goulds Pumps Inc.

Control Instruments

Control instruments, many of the air-operated type, were furnished by Bailey Meter Company, Fisher Governor Company, Foxboro Company, Mason-Neilan Regulator Company and Taylor Instrument Companies. Compressed air, for the operation of these controls and also for general use throughout the mill, is furnished by a Pennsylvania 750 cfm two-stage machine which is equipped with a multi-step unloader, and which is driven by a 150 hp engine-type synchronous motor.

Valves for steam service were supplied, in the main, by The Reading, Pratt & Cady Company; while The Bagley & Sewell Company, The Crane Company, DeZurick Shower Company and The Merco-Nordstrom Valve Company, furnished numerous valves for other specific uses throughout the plant.

In the wood yard there is a 100,000 gallon elevated tank, furnished by Ingalls Iron Works, which serves the fire protection system. Also related to the fire protection system are a 1,000 gpm Goulds underwriters pump and the necessary dry and wet sprinklers, underground lines, hydrants and hose houses.

In the southeastern corner of the yard, at the river bank, there was erected a new building to house the laboratory facilities.

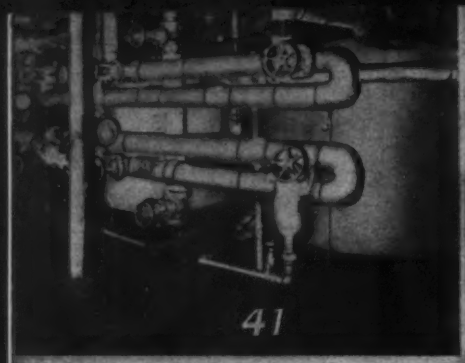
Office facilities for the mill were provided in a remodeled previously existing building on the other side of the main highway opposite the wood yard, at the entrance to which a time office was erected.

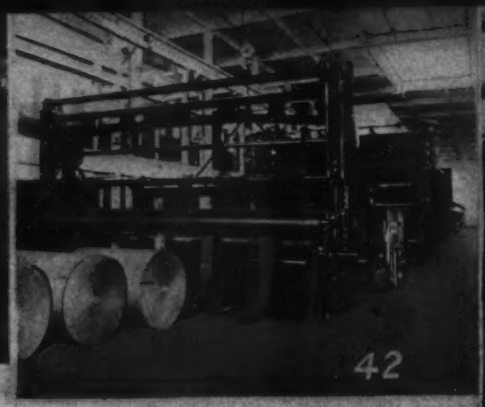
Excellent Transportation Facilities

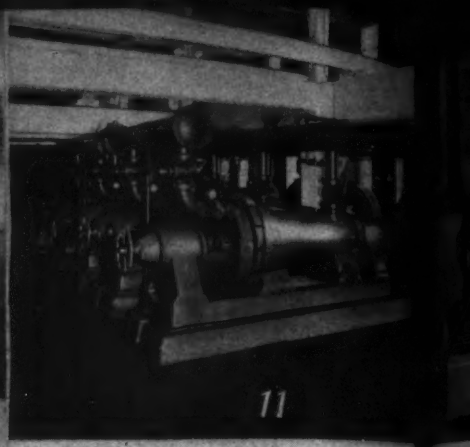
Situated near the large bend in the St. Johns River at the Northeast side of the City adjacent to the Jacksonville Municipal electric generating station, the mill site is quite well served by rail, highway, and river transportation.

Low Figures Per Ton of Product

In the May, 1939 issue of POWER MAGAZINE there was published an article comprising a comparison of the steam and power generating facilities installed in the nine most recently built pulp and paper mills in the South. In the over-all power picture presented in that article the steam and power consumption figures, per ton of product, were not identified in respect to the specific mills to which the high and low figures applied; but it was noted that the National Container Corporation mill shows extremely low figures, per ton of product, for both total steam consumed and total electrical energy consumed.







INSTALLATIONS IN MILL OF NATIONAL CONTAINER CORP. JACKSONVILLE, FLA.

4. CARTHAGE Chipper, Driven Directly by a Synchronous Motor, Shown from the Feed End.

8. Close-Up View of Drive End of Second Stage IMPCO Washer Looking Toward Third Stage Washer in Background.

11. Eight of Latest Type of JONES Majestic Jordans.

18. Blow Tank Installed by INGALLS IRON WORKS.

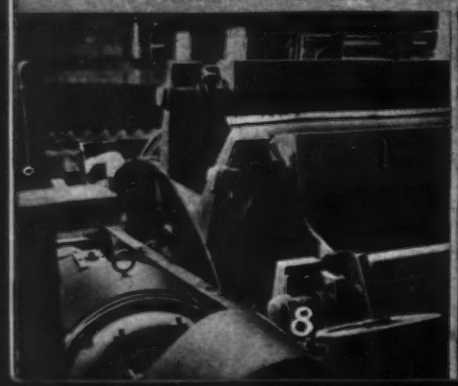
19. Interior Digester House Showing Four Liquor and Pulp Circulating Pumps.

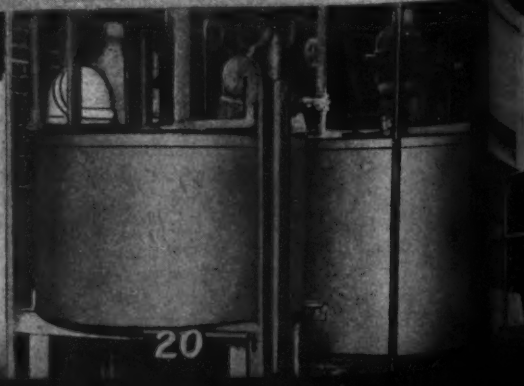
20. PERMUTIT Electro-Chemical Feed.

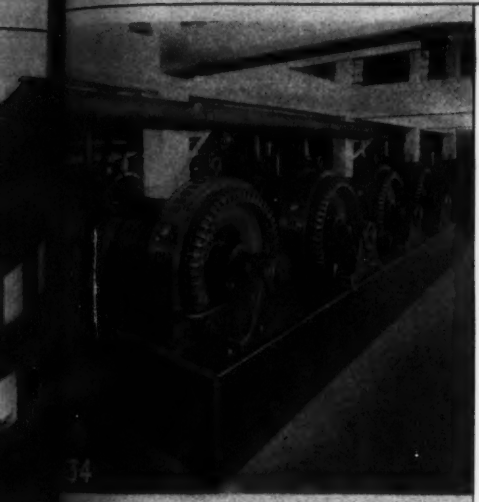
41. Double Unit PERMUTIT Pressure Filters With Hot Lime Soda Softeners in Background.

42. PUSEY & JONES Fourdrinier with Winder.

43. GOSLIN - BIRMINGHAM Evaporator.







INSTALLATIONS IN MILL OF NATIONAL CONTAINER CORP. JACKSONVILLE, FLA.

31. WESTINGHOUSE Splash-proof Motor on GOULD Flat Box Drainage Pump.

32. Knife Grinder, Driven by 15 HP. 1200 RPM WESTINGHOUSE Type CS Motor.

33. Stock Chest Agitator, WESTINGHOUSE 440 Volt Starter Group.

34. Eight 350 HP, 400 RPM WESTINGHOUSE Synchronous Motors Driving Jordans.

35. WESTINGHOUSE 440 Volt Starter Group in Brown Stock Washing Department.

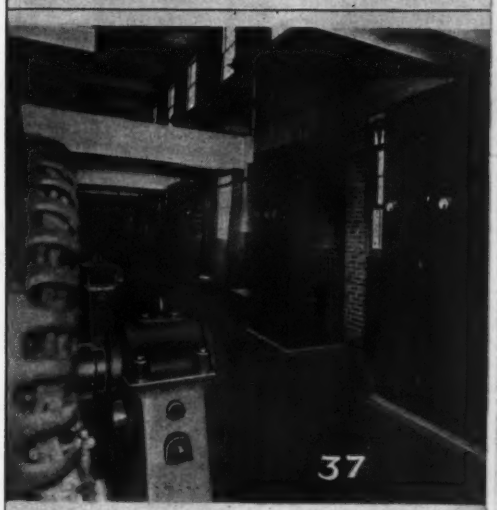
36. WESTINGHOUSE 2,300 Volt Cubicle Group in Brown Stock Washing Department.

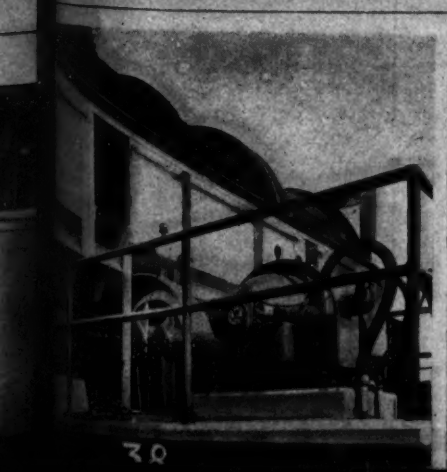
37. WESTINGHOUSE Starters for Eight 350 HP Jordan Motors.

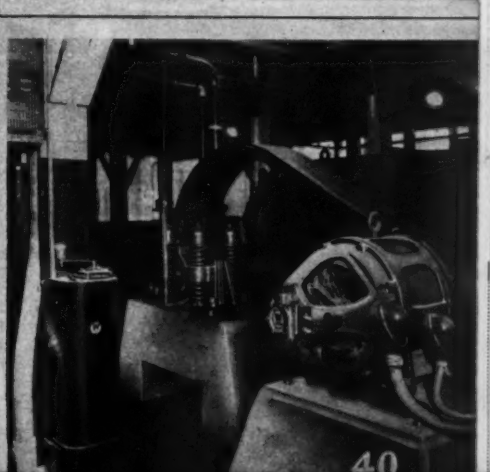
38. WESTINGHOUSE Splashproof Wound Rotor Motor Driving Barking Drum.

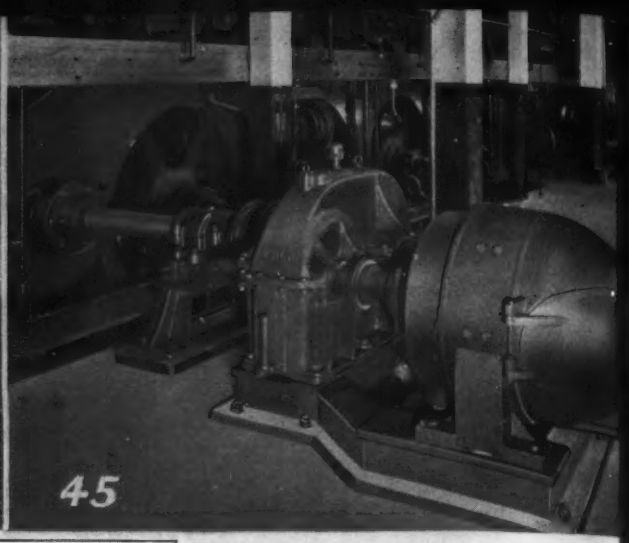
39. 88 Inch Chipper Driven by 200 HP, 300 RPM WESTINGHOUSE Synchronous Motor.

40. 2,300 Volt WESTINGHOUSE Motor and Control for Broke Beater.









INSTALLATIONS IN MILL OF NATIONAL CONTAINER CORP. JACKSONVILLE, FLA.

44. Type 600 TYLER-NIAGARA Screens.

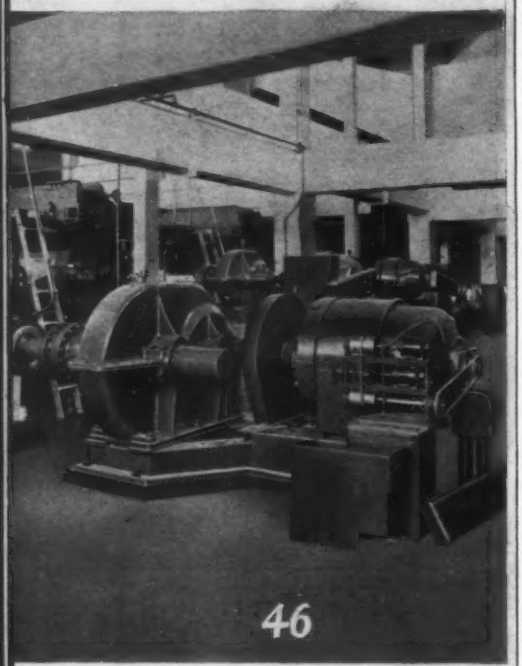
45. G-E Sectional Electric Drive of Third Drier Section of Pusey & Jones Fourdrinier. View Toward Dry End Showing Motor and Gear.

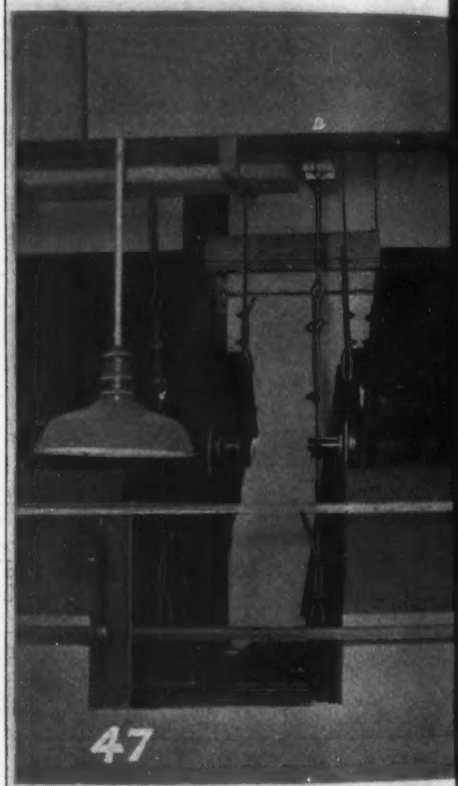
46. G-E Sectional Electric Drive of Couch Section, Showing Gear, Flywheel, Motor and Regulator Transmitter With Guards Removed.

47. TYLER - NIAGARA Wood Chip Screens.

48. G-E Sectional Electric Drive of Calender Sections, Showing Motor, Gear and Regulator Transmitter Unit.

49. G-E Sectional Electric Drive of Second Drier Section, Showing Motor and Gear.





Sub-Contractors and Manufacturers of the Principal Equipment

Agitators	Dilts Machine Works
Air Compressor	Pennsylvania Pump & Compressor Co.
Air Removal on Driers	Walker Jamar Co.
Bark Burning Boiler	Combustion Engineering Co.
Bark Burning Furnace	The M. A. Hofft Co.
Barking Drum	Carthage Machine Works
Beater (Broke)	Dilts Machine Works
Blowers & Fans (All Boilers)	B. F. Sturtevant Co.
Blow Down Condenser	Foster Wheeler Corp.
Boiler Feed Water Treatment	Permutit Co.
Boiler (Oil-Fired Power)	Babcock & Wilcox Co.
Burned Lime Handling (Two Ross Lime Feeders and one Dorrco Slaker)	The Dorr Co., Inc.
Causticizing	Mount Chemical Equipment Co.
Chip Screens	W. S. Tyler Co.
Chipper	Carthage Machine Works
Conveyors (Logs, Bark, Chips, and Sawdust)	Jeffrey Manufactring Co.
Conveyors (Lime)	Link-Belt Co.
Condensers	Foster Wheeler Corp.
Condensate System	Alpha Steam Specialty Co.
Control (Combustion)	Bailey Meter Co.
Control (Drier Temperature Paper Machine)	Foxboro Co.
Control (Digester Relief)	Taylor Instrument Co's.
Control (Desuperheater)	Mason-Neilan Regulator Co.
Control (Digester Steam Flow Limit)	Taylor Instrument Co's.
Control (Digester Temperature and Pressure)	Taylor Instrument Co's.
Crane	Northern Engineering Co.
Crusher (Salt Cake)	Jeffrey Manufacturing Co.
Cubicles	Westinghouse Electric Mfg. Co.
Digesters	Foster Wheeler Corp.
Digester Circulating Systems	Foster Wheeler Corp.
Drive (Paper Machine Sectional)	General Electric Co.
Drives (Winder)	General Electric Co.
Elevator (Finished Board)	Revolvator Co.
Elevator (Recovery Room)	Revolvator Co.
Evaporators	Goslin Birmingham Mfg. Co.
Fans (Ventilating)	American Blower Co.
Felt Conditioner	Vickery
Filters (Lime Mud)	Mount Chemical Equipment Co.
Flow Meters	Bailey Meter Co.
Flow Meters	Brown Instrument Co.
Flow Meters	Taylor Instrument Co's.
Fourdrinier	Pusey & Jones Co.
Grinder (Chipper Knife)	Bridgeport Safety Emery Wheel Co.
Grinder (Paper Machine Rolls)	Lobdell Car Wheel Co.
Hood (Paper Machine)	Walker Jamar Co.
Kilns (Recovery)	D. J. Murray Manufacturing Co.
Kiln (Lime)	Vulcan Iron Works
Lime Mud Handling (2 Special Dorr Type ATB Thickeners, Two No. 4 Type SSM Dorrco Diaphragm Pumps)	The Dorr Co.
Lubrication (Paper Machine)	S. F. Bowser Co.
Motors (General Purpose and Synchronous)	Westinghouse Electric Mfg. Co.
Motors (Paper Machine and Winder Drives)	General Electric Co.
Oil Burners (Lime Kiln)	Lee B. Metler
Oil Burners (Power Boiler)	The Babcock & Wilcox Co.
Oil Burners (Waste Heat Boiler)	Combustion Engineering Co.
Pressure Gauges	Consolidated Ashcroft Hancock Co.
Pumps (Brown Stock)	Warren Steam Pump Co.
Pumps (Black Liquor, Fuel Oil, Water and Miscellaneous)	Goulds Pumps, Inc.
Pumps (Boiler Feed)	Goulds Pumps, Inc.
Pumps (Evaporators and Causticizing Dept.)	LaBour Manufacturing Co.
Pumps (Vacuum)	Roots Connersville Blower Corp.
Pumps (Vacuum)	Nash Engineering Co.
Pulp Screens	Improved Paper Machinery Co.
Recausticizing (2 Dorrco Turbo Causticizers)	The Dorr Co., Inc.
Recorders (Temperature)	Bristol Co.
Recorders (Desuperheater Temperature)	Mason-Neilan Regulator Co.
Recorders (Digester Temperature and Pressure)	Taylor Instrument Co's.
Recorders (Digester Steam Flow, High and Low Pressure)	Taylor Instrument Co's.
Recorders (Steam Flow from Boilers)	Bailey Meter Co.
Recorders (Steam Flow to Various Departments)	Brown Instrument Co.
Rolls (Press, Felt and table)	Stowe-Woodward
Rubber Covering (Complete)	Stowe-Woodward
Scales (Printweight)	Toledo Scale Co.
Scales (Miscellaneous Portable Platform)	Fairbanks Co.
Soot Blowers	Diamond Power Specialty Co.
Sprinklers	Moore Pipe & Sprinkler Co.
Speed Reducers	Falk Corp.
Steel (Plate Work)	Ingalls Iron Works
Steel (Structural)	Jones & Laughlin Steel Co.
Suction (Couch Roll)	Downington Manufacturing Co.
Suction Presses (Rubber Covered)	Downington Manufacturing Co.
Switchboards	Westinghouse Electric Mfg. Co.
Tanks	Ingalls Iron Works
Thermometers (Indicating)	American Schaeffer & Budenberg Co.
Thickener	Improved Paper Machinery Co.
Trucks (Gasoline Lift)	Tow Motor Co.
Turbine (Steam)	General Electric Co.
Valves (Steam)	Reading Pratt & Cady Co.
Valves (Liquor)	Merco Nordstrom Valve Co.
Valves (Stock)	DeZurik Shower Co.
Valves (Water and Miscellaneous)	Crane Co.
Well	Layne Atlantic Co.

New Disintegrator of Pulp Wood Chips

Respats Inc., 530 Wellington avenue, Cranston, R. I., has developed a new type of disintegrating mill for reducing wood chips. It is claimed no other machine on the market has the same characteristics or produces the same type of end product.

The machine, a patented device, consists essentially of an annular steel pan or trough, having a horizontal bottom joined to an outer wall of curved and inclined form. The trough may be of any diameter up to 6½ feet or more and may rotate at any desired speed up to 60 or more revolutions per minute. Inside and supported on the pan are a pair of heavy steel rollers, which are carried from a stationary frame mounted outside of the pan. The rollers are driven by the rotating pan.

The axes of the rollers are parallel and offset with respect to each other and the suspension device permits a free vertical and horizontal movement of the rollers which is controlled by the amount of material between the rollers and the rotating pan-shaped trough.

The chips are put in the mill in batches of from 60 to 80 pounds, including 50 per cent moisture for control purposes and for the initial hydration of the fibers. The operating period for each batch is from three to four minutes. The chips are subjected, by the operation of the machine, to a rolling pressure and release, also to a crushing, rubbing and attrition action between the curved rim of the pan and the similarly curved end faces of the rollers.

After the material has passed under one of the rollers, it is scraped from the pan and is projected forward, by centrifugal force, to the upper edge of the trough and under the forward roller. An 80 pound batch, processed four minutes in the mill, would pass under the 6000 pound rollers many times. There is also the added force of the centrifugal pressure exerted by the end portion of the rollers against the curved rim of the pan. Each batch may be removed from the mill by scrapers or air suction and a new batch be put in the mill with only a very slight delay in the grinding process.

The effect of the Respats mill action is to hydrate the material and to soften, expand and divide the fiber without cutting it. About 80 per cent of the end product is suitable for the manufacture of insulating board and the remainder may be reduced by beaters or other refining units to a similar condition, or screened out and re-processed in the Respats machine.

The Respats process and equipment was developed for the manufacture of insulating board, but it is now believed that the end product of the Respats mill may find a place in several industries. It is thought that pulpwood chips may be given a preliminary treatment in Respats mills and thereafter subjected to chemical cooking to produce a more uniform and stronger paper fiber, with economy in the cost of cooking, of chemicals and final reduction. A Respats mill with pan 6½ feet in diameter and rotating at 60 rpm. requires 35 hp. and will produce about 7.0 tons, bone dry basis, of end product per twenty-four hours operation.

A. W. P. Stock Issue Ready

The Stock Exchange has announced that it will substitute the $5 common stock of A. P. W. Paper Company, Inc., for the no-par common.

National Folding Box Co. Builds 400-lb. Power Plant At New Haven Mill

by Frederick L. Smith, Engineer

The new power plant at the National Folding Box Company, New Haven, Conn., designed by and constructed under the supervision of the Frederick L. Smith engineering organization, of New York City, provides an interesting example of the manner in which an old boiler plant can be reconstructed and modernized without interferring with or interrupting the operation of the plant during the transition period.

Previous to the reconstruction, the existing plant was operating at 150 lb. pressure and consisted of six water tube boilers arranged in three batteries, equipped with Dutch Oven type furnaces and Murphy stokers.

Because of the higher economy of modern high pressure steam generators, it was decided, after a careful study of capital costs and operating economies, to replace the existing 150 lb. boilers with higher pressure units of sufficient capacity to take care not only of present needs, but to provide for an anticipated future greater steam demand over a period of approximately ten years.

Two New Bent Tube Type Boilers Installed

Accordingly, two new bent tube type boilers, designed for a pressure of 450 lb. and 618 deg. total temperature and rated at 89,000 lb. per hour each, were installed. Each unit has 7536 square feet of heating surface in the boiler, 1018 square feet in the water walls and 3234 square feet in the economizer. The economizer is of the steel type having 14 rows of elements high, 7 rows wide. A superheater is installed in each boiler for delivering the steam to the mains at 170 deg. superheat.

Each boiler is equipped with a six retort underfeed stoker with link grates and hydraulic variable speed motor drive. Each stoker is driven by a 5 hp. direct current motor but in addition there is mounted a one horse power alternating current motor at the side of each driving motor. These A.C. motors have V-belt sheaves which can be belted to similar sheaves on the stoker drive shaft. Under emermergency conditions and when both boilers are down and cold these A.C. motors, receiving current from an outside source, can operate the stokers under low load and when starting up.

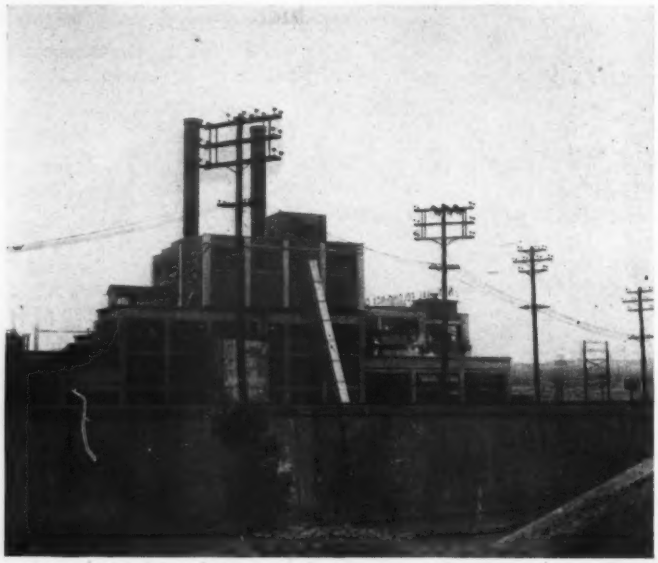


FIG. 1.
Exterior view of power plant. Enclosed inclined coal conveyor to upper portion of boiler house.

Automatic Control

Both boilers are automatically and independently controlled. A boiler control board, containing the controls and instruments for both boilers is located at the north wall of the boiler room and is directly in front of both boilers. Fig. 4 shows a front view of this board. The board is symmetrically arranged, having the instruments common to both boilers on the center panel and the adjacent panels on each side having the instruments and controls for the respective boiler. At both ends of the board are located the electrical control panels for the motors driving the respective boiler equipment such as forced draft fans, induced draft fans, stoker drives, etc. Each boiler is normally operated under full automatic control, but either or both boilers may be operated manually, if so desired.

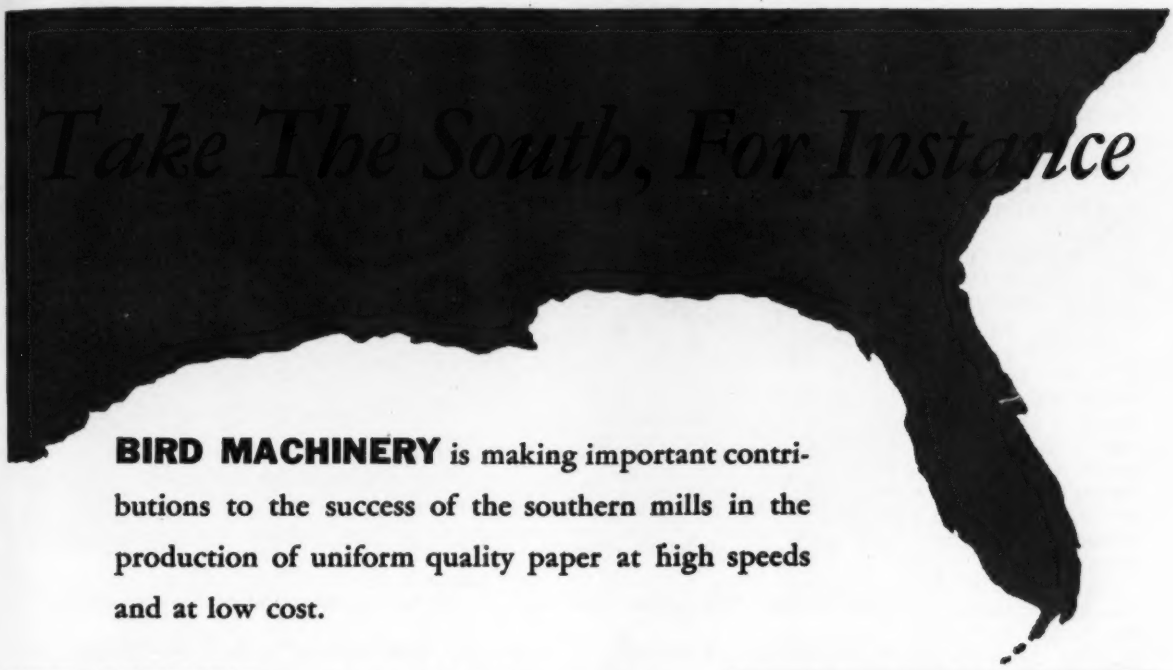
A deaerating feed water heater is installed above and at the rear of the boilers. An automatic feed water regulator on each boiler maintains a constant water level in the boilers at all times.

Two feed pumps are provided each rated at 300 g.p.m. against a head of 1150 feet. One pump is electrically driven by a variable D.C. motor for normal operation and the other pump is driven by a steam turbine to provide for operation in case of failure of the electrical system.

Equipped with Clinker Grinder

Each stoker is equipped with a clinker grinder which delivers the ashes to the ash hopper at the rear of each boiler on the basement floor level. From here the ashes are blown by means of a steamatic ash conveying system to a concrete ash hopper in the yard and thence trucked from the plant.

Water treatment consists of adding caustic and Buromin to the feed water. These chemicals are fed con-



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Chesapeake Camp Corp., Franklin, Va.
Gaylord Container Corp., Bogalusa, La.
Gulf States Paper Corp., Tuscaloosa, Ala.
Hollingsworth & Whitney Co.
Mobile, Ala.
National Container Corp.
Jacksonville, Florida
St. Joe Paper Co., Port St. Joe, Florida
Southern Advance Bag & Paper Co.
Advance, La.
Southern Kraft Corp., Springhill, La.
Southern Kraft Corp., Georgetown, S. C.
Southland Paper Mills, Lufkin, Texas

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tinuously by two Hills-McCanna motor driven pumps. The Buromin is fed directly into the lower drums of the boilers and the caustic is fed into the main feed line to the economizer.

Each boiler is equipped with a self supported steel stack supported on the steel building structure and extending 72 feet above the induced draft fan floor. These two steel stacks were in place during the hurricane of 1938 and came through without any damage.

Fig. 5 is a typical cross section through the boiler house showing the arrangement of boilers and auxiliary equipment.

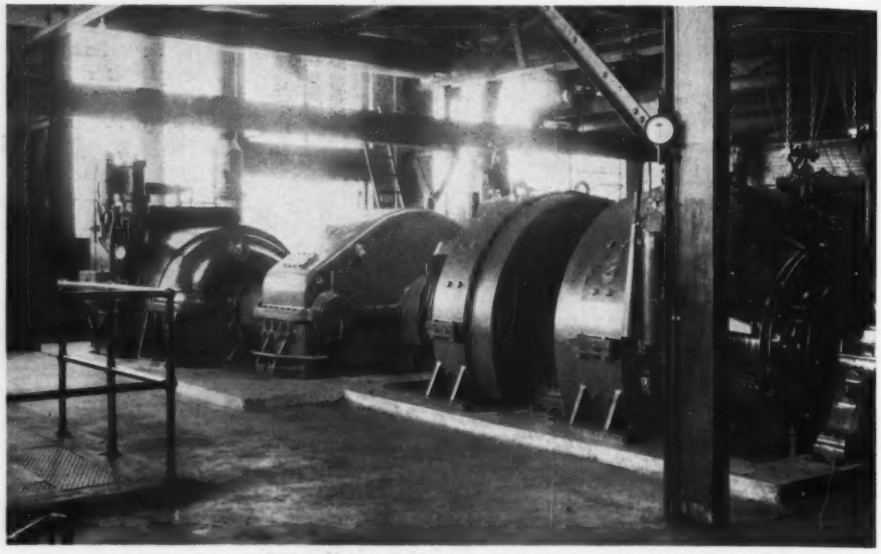


FIG. 3.
The new 3000 K.W. unit showing turbine, reduction gears and two direct current generators on same shaft.

Coal Delivery

Coal is delivered to the plant in railroad cars, and is carried in an enclosed inclined bucket conveyor to the top of the boiler house (see Fig. 1) where it is delivered to an overhead conveyor running above and parallel to the bunker. This overhead conveyor delivers and distributes the coal to the bunker. The coal for each boiler is drawn through a spout from the bunker, and passes through an automatic electric scale and is then delivered to the stoker hopper thru a conical coal spreader. These automatic scales operate continuously and each is designed to weigh a maximum of six tons per hour. A reciprocating counter continuously records and totalizes the weighings.

To avoid the hanging up of the coal in the bunker and the spouts when the coal is wet, there are installed vibrators both on the underside of the bunker and the outside of the spouts leading to the scales. These vibrators are pneumatically operated, the operation being controlled by an electrically operated valve. A time relay mechanism is arranged so that if there is a stoppage in the flow of coal onto the scale for a set period, normally 30 seconds, the vibrators are automatically set in operation

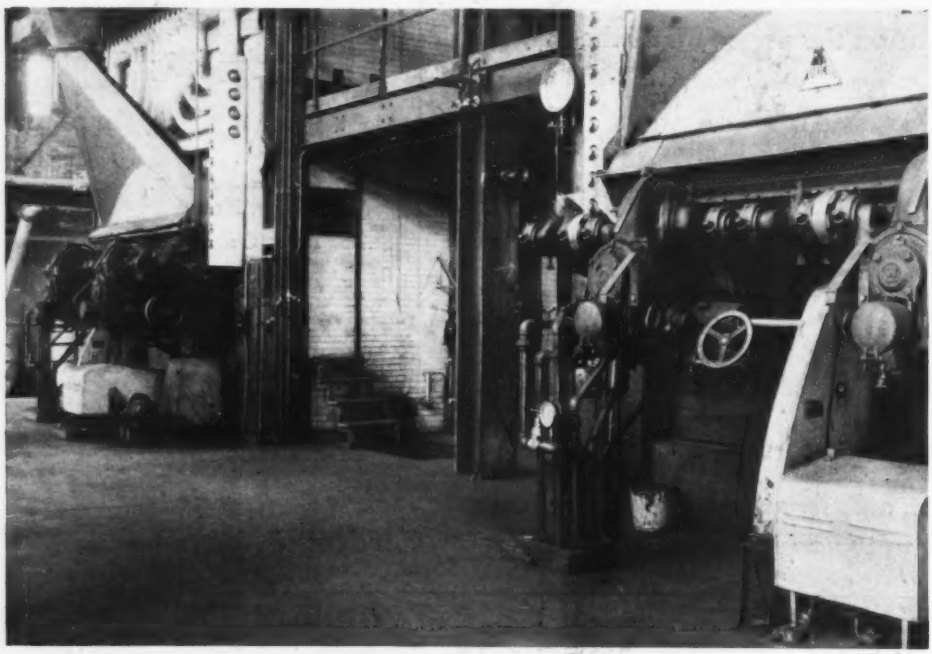
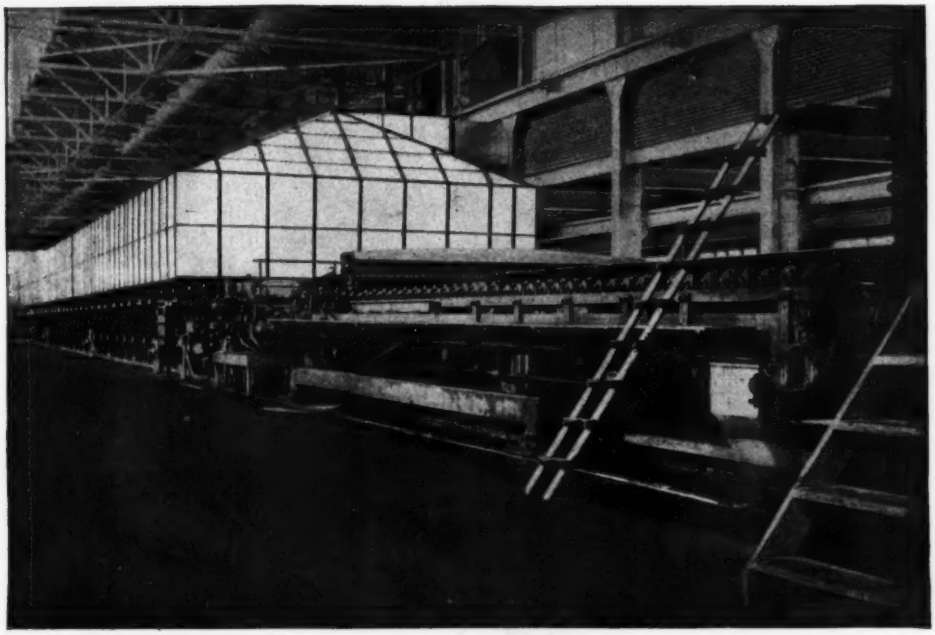


FIG. 2.
Front view of the two new 400-lb. boilers showing stokers and conical coal spreader.

Continuous Operation

One of the main problems presented by the reconstrution program was to keep the plant operating while the old boilers were being removed and the new boilers installed. This continuous operation was accomplished by first removing

ANOTHER BELOIT MACHINE



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the battery of two old boilers at one end of the existing boiler room and then installing the first new boiler in the space made available. In the meantime the entire steam load was being carried by the four remaining old boilers.

The weight of the new boilers is carried on pile foundations and because of the character of the soil and the proximity of existing piles carrying the building foundations it was necessary to resort to jacking the new piles into place in order not to disturb the existing piles. The new piles were jacked to a depth of approximately 90 feet and each pile is good for a load of 40 tons. Before removing the old boilers they were completely filled with water and used as a dead weight to take the reaction during the jacking operation. The piles consist of sections of 12 inch I. D. black steel pipe, ⅜ inch thickness. When the piles were jacked to the necessary depth they were cut off at the required elevation, cleaned out by water jet, and completely filled with concrete.

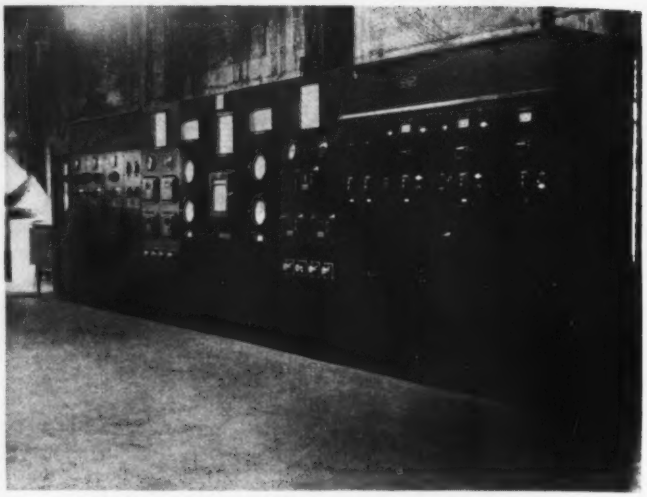

FIG. 4.

Front view of new boiler control board. Controls are arranged symmetrically on either side of center panel which contains instruments common to both boilers. The controls for the motors driving the auxiliaries are on the end panels.

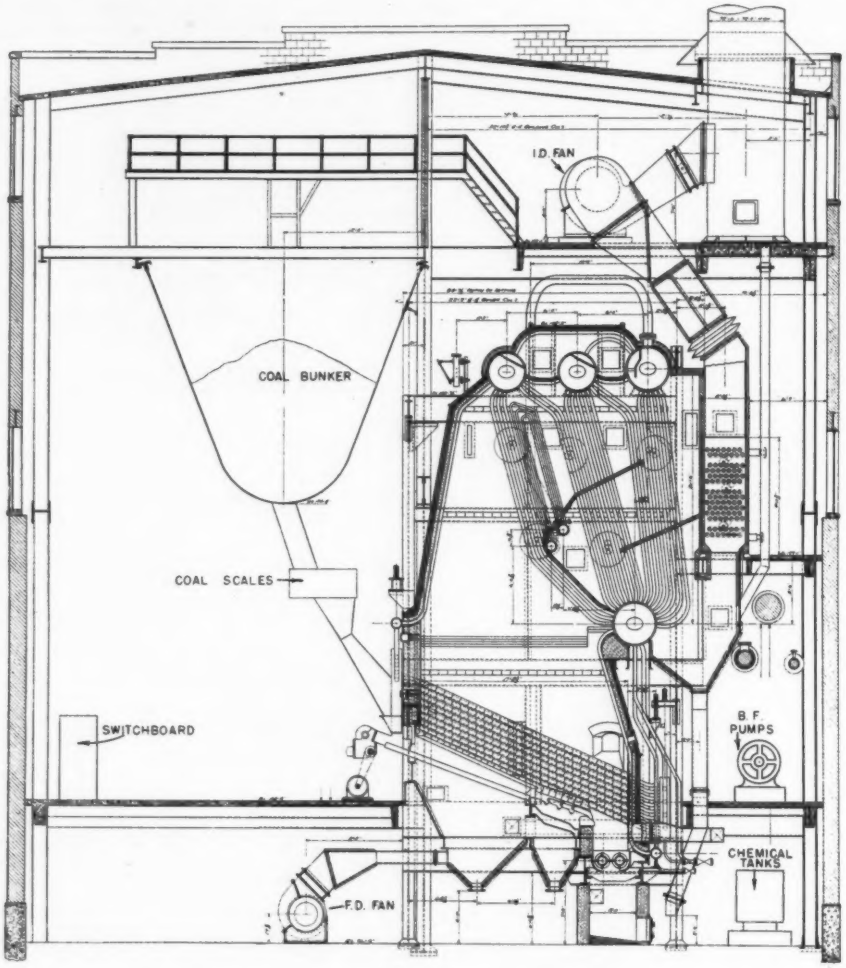

FIG. 5.

Cross section view through boiler house showing boilers and auxiliary equipment. The upper portion of boiler house is entirely new; the stacks are supported on the induced draft fan floor.

New Coal Conveyor

Because of the additional head room required for the new boilers it was necessary to alter and completely rebuild the upper portion of the old boiler house. A new coal bunker and coal conveyor were installed in the rebuilt portion. This was all accomplished without interfering in any way with the operation of the boiler house during the changeover period.

After the installation of the first new boiler was completed it was put on the line, temporarily generating steam at 150 lb. The next battery of two old boilers was then removed to make way for the second new boiler, the first new boiler together with the third old battery carrying the load in the meantime.

At the same time that the new boilers were being erected in the boiler room, there was installed a new 3000 kw turbo-generator in the turbine room. This is a condensing extraction type unit built for operation at 400 lb. pressure, 618 deg. t.t., 3600 r.p.m. Fig. 3 shows a view of this

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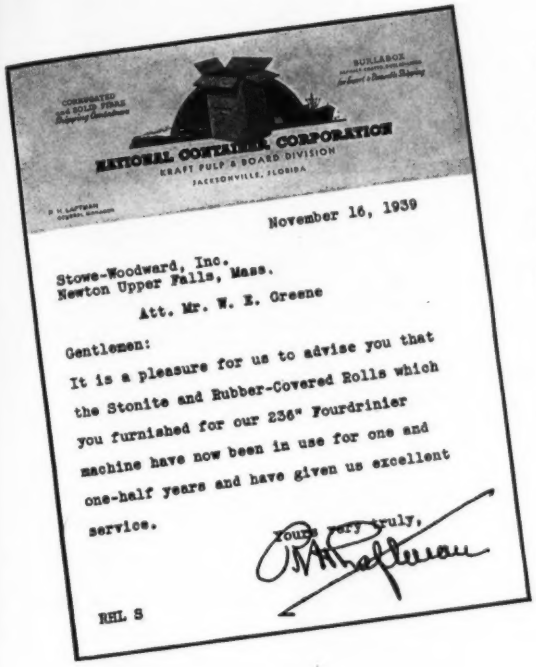

November 16, 1939

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2	Wormed Felt Rolls
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TOTAL 42	

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new generating unit. The turbine, at 3600 r.p.m. drives through a set of reducing gears to a shaft at 514 r.p.m. with two 1500 kw. generators mounted on this same shaft. The generators are 250 volts direct current units, direct current being used for power throughout the mill. The new turbo-generator is designed for the extraction of 70,000 lbs. of steam per hour at 30 lb. pressure for use in process in the mill.

New Foundation

It was necessary to build a new foundation for this turbo-generator and this foundation also had to be supported on piles similar to those used to support the boilers. In this case, however, the dead weight for jacking consisted of pig iron placed on the operating floor, which floor was suitably reinforced, to provide the necessary reaction for the jacking of the piles.

There was also installed in the turbine room a single beam hand operated crane, 8 tons capacity, equipped with two short headroom trolley hoists each 5 tons capacity. This crane was used in the erection of the new turbo-generator and is also available for any future repairs which may be required to the unit.

Desuperheater Installed

Originally there were three turbo-generators in the old power plant. One of these units, 1000 kw., was rebuilt for operation at 400 lb. pressure, the capacity of the unit remaining unchanged. The other two, 1000 kw. and 500 kw. units are still available for emergency and week end operation at 150 lb. pressure through a pressure reducing valve from the 400 lb. main. A desuperheater is also installed for desuperheating the steam for use in the old units.

Any additional steam required for mill process, over and above that extracted from the turbo-generator units, can be obtained from the high pressure main through reducing valves and desuperheater.

The installation of the new 3000 kw. generator required considerable changes and rearrangement to the bus work on the main switchboard in the turbine room, together with the installation of new control panels for the new generator. The two new 1500 kw. generators are connected by copper bus bars to their respective breaker panels located in the basement. Copper bus bars connect the breakers to the main bus behind the main switchboard on the operating floor. The breakers, located in the basement, are operated by remote control from their respective control panels on the main switchboard. The bus work in the rear of the main switchboard was also rebuilt and increased in size to take care of the increased capacity provided by the new generators. The electrical work also included the installation of complete new power circuits in the boiler room for the motors driving the boiler auxiliaries. A com-

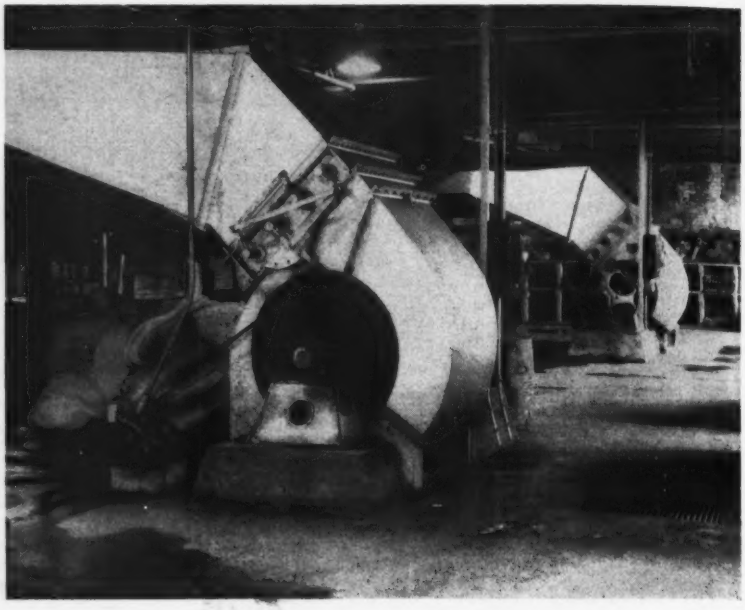

FIG. 7.
Forced draft fans in basement below firing floor level.

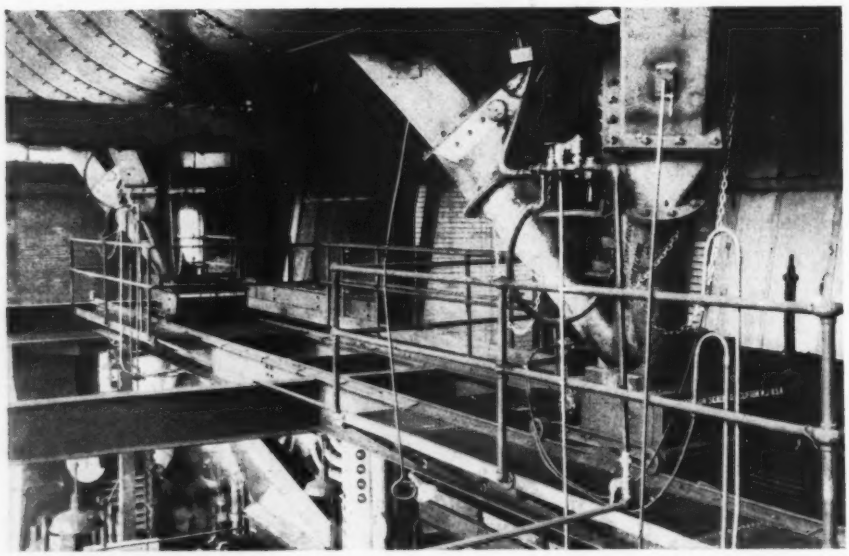

FIG. 6.
View beneath coal bunker showing pneumatic vibrators installed on spouts leading to automatic electric coal scales.

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Unretouched photograph of installation at Rising Paper Co., Housatonic, Mass., a division of the Strathmore Paper Co.

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Heretofore only the larger units were available.

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plete new lighting system was also installed in the boiler room. An automatic transfer switch is installed so that in the event of failure of the mill electrical power the lighting system in the power plant will automatically be connected to an outside source of A.C. current.

Now Operates at 85 Per Cent

The existing power plant, previous to the installation of the new units, operated at an overall efficiency of approximately 71 per cent. Since the installation of the new boilers and the completion of the rehabilitation program it is indicated that the efficiency of the new power plant is approximately 85 per cent.

Because of the increased steam generating capacity of the new plant a definite increase in mill output has been obtained but the new power plant has not been operating long enough to quote definite figures in this connection.

The entire operation was carried out under the direct supervision of a field engineer of the Frederick L. Smith organization. This field engineer was on the job from the start and remained until the entire program was completed and all new units in operation. He not only supervised all the new construction and the installation and erection of all new equipment but also, being an operating engineer, had direct charge of putting all the new units in operation.

This project is a typical example of what can be done to improve existing conditions in an existing power plant, particularly where the problem involved is not only the improved and more efficient operation of a power plant but also as it is related to the operation of a paper mill and all the problems peculiar to paper mill operation.

Principal Equipment

The principal equipment manufacturers and subcontractors were as follows:

BOILER EQUIPMENT

Boilers—2 Bent tube designed for 450 lb. w.p. 618 deg. t.t., 89,000 lb. per hr. max. each with 7536 sq. ft. in boiler, 1018 sq. ft. water walls and 3234 sq. ft. in economizer—The Bigelow Company.
Economizer—2 Steel tube extended surface type 3234 sq. ft. arranged in 14 rows of elements high, 7 rows wide. Designed for 450 lb. w.p. Gas leaving economizer 405 deg. F. Feedwater to economizer 260 deg. F.—The Foster-Wheeler Corporation.
Stoker—2 Underfeed, 6 retort, link grate, hydraulic drive variable speed motor drive—Westinghouse Electric and Manufacturing Company.
Stoker Oil Pumps—Schutte & Koerting Company.
Coal Spreaders—Conical coal spreaders on stoker hoppers.—Stock Engineering Company.
Vibrators—Peerless Vibrator Company.
Forced Draft Fan—2—35,000 c.f.m. at 100 deg. F., 5.5. s.p. driven by Westinghouse variable speed d.c. motors, damper controlled—American Blower Company.
Induced Draft Fan—2—55,000 c.f.m. at 478 deg. F., 5.5 s.p. driven by Westinghouse variable speed d.c. motors damper controlled—American Blower Company.
Smoke Stacks—2 Steel stacks 6 ft. 6 in. dia. by 72 ft. high—The Bigelow Company.

BOILER ACCESSORIES

Feedwater Regulator—Copes—Northern Equipment Company.
Soot Blowers—Vulcan Soot Blower Company.
Blow-Off Valves—Yarnell Waring Company.
Gauge Columns—Reliance Gauge Column Company.

COAL AND ASH HANDLING

Conveyor—Robinson Branin Company.
Coal Scales—Automatic Electric—Richardson Scale Company.
Ash Conveyor—8" dia. "Steamatic"—United Conveyor Corporation.

FEEDWATER HEATER AND PUMPS

Feedwater Heater—Deaerating type, max. capacity 150,000 lb. per hr.—Cochrane Corporation.
Atmospheric Relief Valve—Cochrane Corporation.
Boiler Feed Pumps—1—2½ in. 4-stage, 300 g.p.m., 1150 ft. head, 3500 r.p.m. driven by Terry turbine.
1—3 in. 6-stage 300 g.p.m. 1150 ft. head, 1750 r.p.m. driven by Westinghouse variable speed d.c. motor—Pennsylvania Pump and Compressor Company.
Booster Pump—2—3 in. single stage 300 g.p.m., 155 ft. head, 1750 r.p.m.—one driven by Terry turbine—one driven by constant speed d.c. motor—Pennsylvania Pump and Compressor Company.

CONTROL AND INSTRUMENTS

Combustion Control System—"Metermax" combustion control regulating draft through damper adjustment—Leeds & Northrup Company.
Pressure Gages—Republic recording—Republic Flow Meters Company.
Steam Flow Recorders—Republic Flow Meters Company.
Level Indicator for F.W. Heater—Republic Flow Meters Company.
CO_2 Recorder—Republic Flow Meters Company.
Temperature Recorders—Leeds & Northrup Company.
Desuperheater Control—The Swartwout Company.

GENERAL EQUIPMENT

Turbogenerator—1—Condensing extraction type turbine designed for 400 lb., 618 deg. F. steam extracting a max. of 70,000 lb. at 30 lb. gage pressure; connected by gears to 2—1500 kw. 250 volt d.c. generators mounted on the same shaft. Westinghouse Electric and Manufacturing Company.
Condensate and Blow-off Tanks—Bigelow Company.
Piping—C. N. Flagg & Co.
Valves—Chapman Valve Company.
Switchboard—Westinghouse Electric and Manufacturing Company.
Electrical Work—The Stevens-Fitch Company.
Boiler Setting—Geo. Allen & Son, Inc.
General Contract—E. & F. Construction Company.
Piling—Foundation Company.
Steel Work—Berlin Construction Company.

New Circular Knife Grinder

This Rogers CC-3 Grinder which is represented in the accompanying illustration combines flexibility with new features of design. It provides both accuracy and uniformity of grinding service. It is of rugged construction for continuous operation. Built for sharpening circular or rotary knives employed for cutting paper, paper board, etc. Samuel C. Rogers & Co., 191-205 Dutton avenue, Buffalo, N. Y., by which concern the new grinder is made say: "This grinder in your plant will keep your knives (2 to 20 inches in diameter) in their original condition, sharp and true, assuring dependable performance of cutting machines. Clean, smooth cuts, rapid and accurate, speed up your production and reduce your costs. You will eliminate costly delays and inconvenience by sharpening your own knives."

A substantial cord type base of massive cabinet design provides positive assurance of true knife rotation and precision accuracy under the heaviest grinding conditions.

The base contains a built-in 2-step coolant tank for wet grinding.

Adjustments to meet all requirements for circular knife grinding are provided by 3 slides with hand wheel screw controls. Each slide is carefully fitted with adjustable steel gibs to take up wear. Swivel is graduated to insure correct grinding angle. The same angle is maintained without any change from wear of grinding wheel or change in size of knife.

Accurate knife alignment and quick change for different arbor sizes are facilitated by mounting knife on an arbor which fits the taper in a hollow spindle. Suitable flanges rigidly support rotating knife. For more universal application on special order, grinder can be equipped with attachment for mounting bottom slitters or rubber cutting knives on centers.

The knife is rotated by a separate motor through V belt.

A sheave of variable pitch is adjustable to the proper circumferential speed, depending on the diameter of the knife to be ground.

MR. ROBERT McC. JOHNSTONE

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The New Morse Chain Drive

The illustrations presented herewith represent the new Morse chain drive made by the Morse Chain Company, Ithaca, N. Y., installed on the paper machine. There are six units in this particular installation and their efficiency is about 98 per cent. There is considerable room behind the unit which is but 30 inches high, yet, each individual drive is capable of transmitting at least 25 hp. continuously. This smaller unit is possible because higher speeds are being worked with. Obviously, when units are running two or three times the speed formerly used, it is possible to use a unit one-half to one-third the size. SKF bearings, Allis-Chalmers variable speed sheaves, Tex-ropes, chain drives, friction clutches, chain flexible couplings, all of which are widely known, have been used to make an attractive self-contained unit and apply it to the paper machine.

It will be observed that the case seems abnormally large, but it was purposely made this way so that any line shaft speed could be used and thereby make a more flexible unit.

The units are connected together with shafting and flexible couplings. When the clutch is in neutral position, the line shaft runs and the unit stands idle. The clutch is then thrown in and the power is transmitted through the unit to the out-put shaft, and the speed of each unit is determined by the silent chain drive from the unit to the machine.

Power is transmitted from the driving shaft by means of a clutch and through a one to one ratio chain drive to a jack-shaft from which a vari-speed v-belt drive is taken.

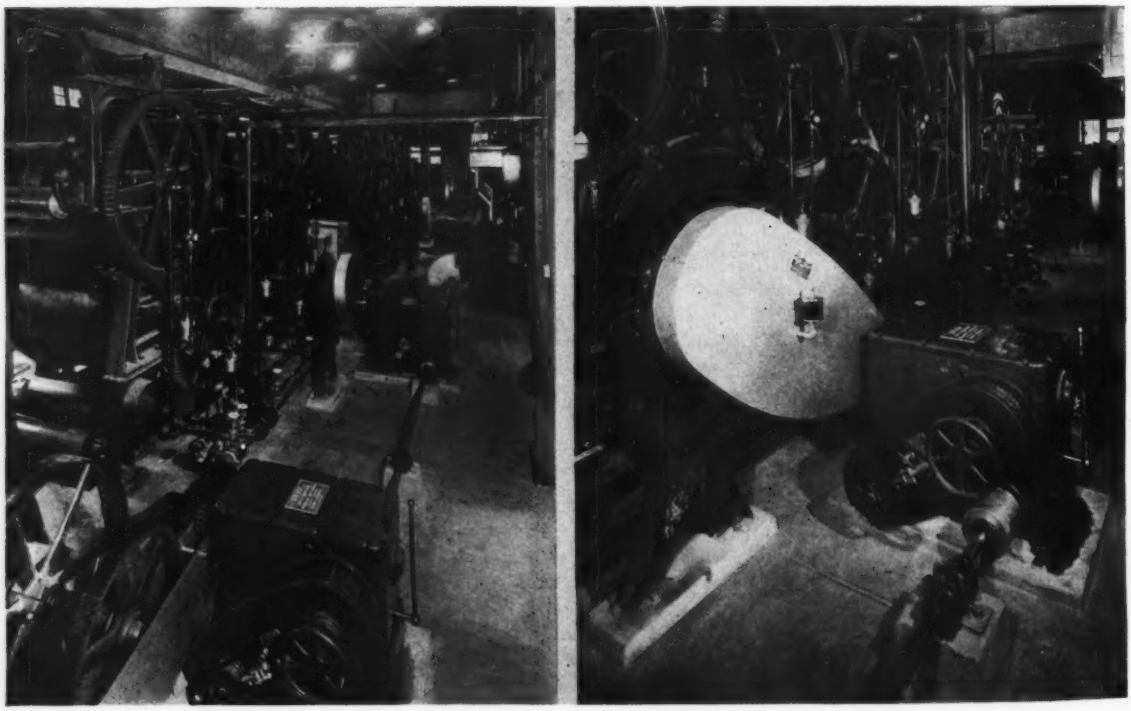
Proper belt tension is maintained by an adjustable mounting for the jack-shaft. The driven shaft of the vari-speed drive carries a hypoid pinion driving to the gear on the out-put shaft with a four to one reduction. From the out-put shaft to the machine a chain drive is provided of such ratio as to give the correct speed to that section of the machine. The unit speed can be adjusted and held at proper speed by use of the variable pitch wheels. This permits a speed variation of 30 per cent. The unit is automatically lubricated. The hypoid gear has its own lubricant in a separate section of the case. The clutch and chain drive run in the oil with a disc providing lubrication for the upper bearing. It is probable that the oil in the case need be changed not more frequently than two or three times annually.

Laboratory Test Gauge

A new streamlined laboratory test gauge has just been announced by the Ashcroft American Gauge Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn. It is essentially a finely adjusted laboratory test gauge for checking the accuracy of pressure gauges. Accuracy is guaranteed to within ¼ of 1 per cent of the scale range.

The outer edge of the dial is a mirror on which the tip of the pointer reflects if the user is not in the correct position to read the gauge accurately. In addition, the gauge has a transparent cover which opens up the dial for easy reading. It is molded of a crystal-clear, transparent plastic with a compression strength of 15,000 lbs. per square inch.

The case is Phenol, light in weight and ideal for portable laboratory test work. Complete data on this new laboratory test gauge will be sent on request.



TWO VIEWS OF THE MORSE CHAIN DRIVE INSTALLED ON PAPER MACHINE.

Summer-Winter Controller

The Minneapolis-Honeywell Regulator Company, 2950 Fourth avenue South, Minneapolis, Minn., has just completed the development of a new summer-winter controller which combines the functions of two controls in one unit and accomplishes the following: Lower first cost—lower installation cost—Simplified installation—Can be mounted in any position—Ideal operating sequence.

The L147 Summer-Winter Controller automatically governs the operation of both the summer and winter cycles. Service calls are eliminated and users are thoroughly satisfied.

The amount of fuel consumed is directly in proportion to the actual demand on the boiler. With this M-H system, the L147 Controller is permanently adjusted by the installer to maintain the minimum boiler temperature necessary to provide the domestic hot water supply—normally about 150 deg. The high limit aquastat is also permanently set by the installer and it functions only as a safety control or high temperature cut-out. During the summer the burner is operated by the L147 controller—but any time the thermostat calls for heat the boiler temperature will be increased just sufficiently to take care of the heating load. In other words, when there is a thermostat demand the boiler temperature will automatically fluctuate between the temperature settings of the L147 Controller and the high limit aquastat in accordance with the heating load.

The circuit arrangement of the L147 Controller is very ingenious, and the terminal arrangement will be appreciated by the installer. When the thermostat calls for heat, the circulator and burner start simultaneously and normally continue in operation until the proper temperature is reached. During this time, the boiler temperature will increase just enough to satisfy the demand. Should a condition arise whereby the boiler temperature exceeds the setting of the high limit aquastat, the burner will stop but the circulator will continue to operate.

TAPPI Notes

The program for the annual meeting of TAPPI February 19-22, 1940, is developing in an excellent way. Sessions have already been planned for the following committees: Water, Alkaline Pulp, Acid Pulp, Mechanical Pulp, Coating, Pulp Purification, Graphic Arts, Non-Fibrous Materials, Heat and Power, Optical Properties, Forming and Finishing, Materials of Construction, Paper Testing, Fibrous Materials and Stuff Preparation. The meeting will be held at the Roosevelt Hotel, New York, New York.

The election ballot of the Technical Association will include the following candidates proposed by the Nominating Committee, consisting of M. H. Teaze, chairman, C. E. Curran and H. H. Hanson: For president—W. H. Swanson; for vice president—R. A. Hayward; for executive commitee—men to serve three years—Albert Bankus, G. Lamont Bidwell, Jr., M. P. Chaplin, and J. L. Parsons. Any group of twenty-five voting members of the association may present other candidates. Thus must be done prior to December 16, 1939.

UNITED PIGMENTS

Pure Titanium Dioxide

UNITANE-O

A brilliantly WHITE, pure titanium dioxide possessing excellent . . .

• OPACITY

• BRIGHTNESS

• DISPERSION

Suitable for ALL types of paper ranging from thin printing papers and waxing tissues to coated book and magazine stocks.

UNITANE O—110 was especially developed for paper pigmentation. Its excellent dispersion in water promotes good retention and excellent sheet formation. As a component of the beater furnish, it produces *whiter* sheets of *great brilliance*, and superior printing qualities.

SAMPLES of UNITANE O-110 will be sent promptly upon request.

UNITED COLORS & PIGMENTS

UNITED COLOR AND PIGMENT CO.

DIVISION OF INTERCHEMICAL CORPORATION

NEWARK, NEW JERSEY

SALES OFFICES IN PRINCIPAL CITIES

The Riley Flue Gas Scrubber in Paper Plants

Second to pulp, steam is perhaps the biggest item in the processing of paper. Consequently, as large scale producers and consumers of steam, many paper plants have been alert to effect maximum economy in steam generation by modernizing their equipment according to the known best practices of the present-day industry. Among other trends there has been in recent years a steadily increasing swing to the use of pulverized coal.

When pulverized coal is burned in suspension the larger portion of the ash residue is carried by the flue gases into the atmosphere. This residue, consisting of ash and varying percentages of unburned carbon, is commonly known as "fly ash."

We read and hear a great deal of agitation against fly ash nuisance. In many cities and densely populated areas, steam plants have been compelled by law or by organized public protests to eliminate this nuisance. By virtue of their location in isolated communities, most paper plants have been free from such outside influences compelling the cleaning of their flue gases. However, considerations other than mere good neighborliness have necessitated the use of fly ash eliminators even in isolated paper plants.

One of the important considerations is that of keeping flue dust out of the "paper stock", in order to maintain maximum quality and a minimum of rejects in the finished product.

A second important consideration is that of reducing maintenance on induced draft fans by eliminating the cutting of fan rotors and fan housings by ash erosion.

Due to the extreme fineness of fly ash particles, the earlier types of cinder catchers were found ineffective in pulverized fuel service. The growing need for more selective dust arresters has naturally stimulated a great deal of activity in the development of new devices. A review of the patents granted during recent years indicates the vast amount of attention given to this problem. "Although many are called, few are chosen"; of the numerous proposed schemes relatively few have proved satisfactory in actual service.

Among the more successful schemes, that utilized in the Riley flue gas scrubber has given a good account of itself as a practical method of eliminating fly ash.

Construction and Operating Principle

Figs. 1, 2 and 3 illustrate the typical arrangement of a Riley flue gas scrubber.

A series of flat shaped elements (a), Fig. 1, are

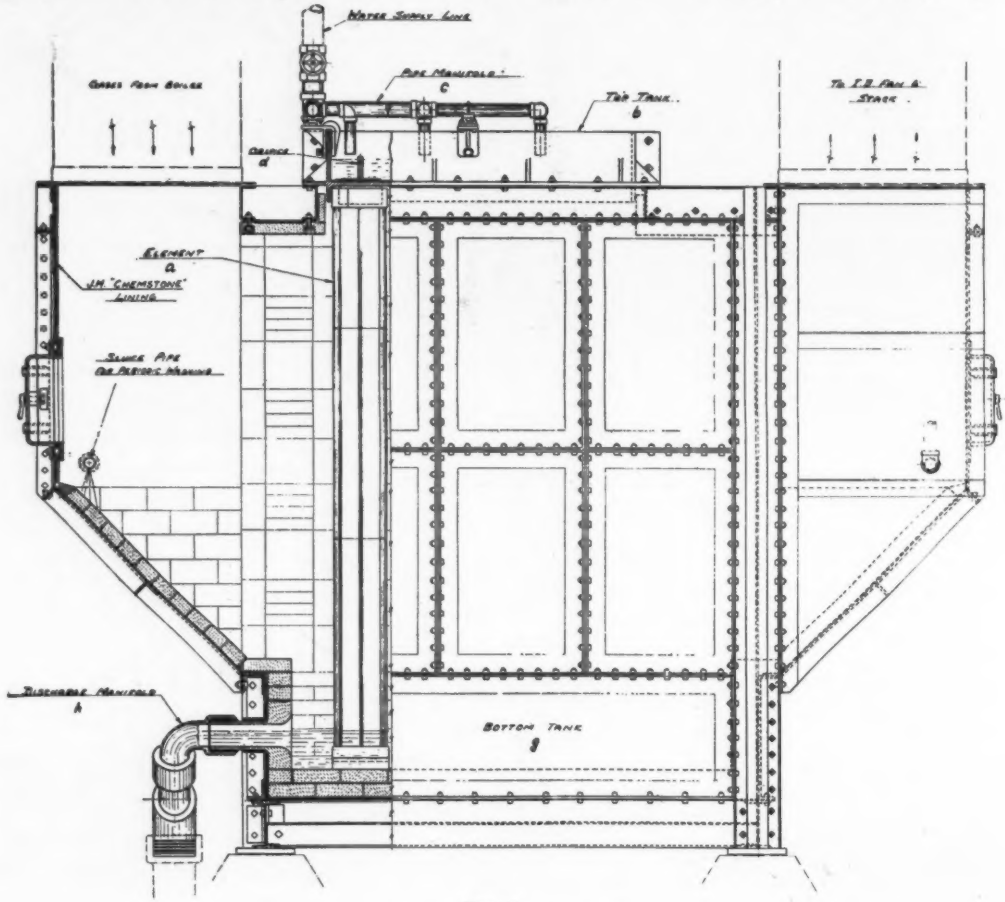
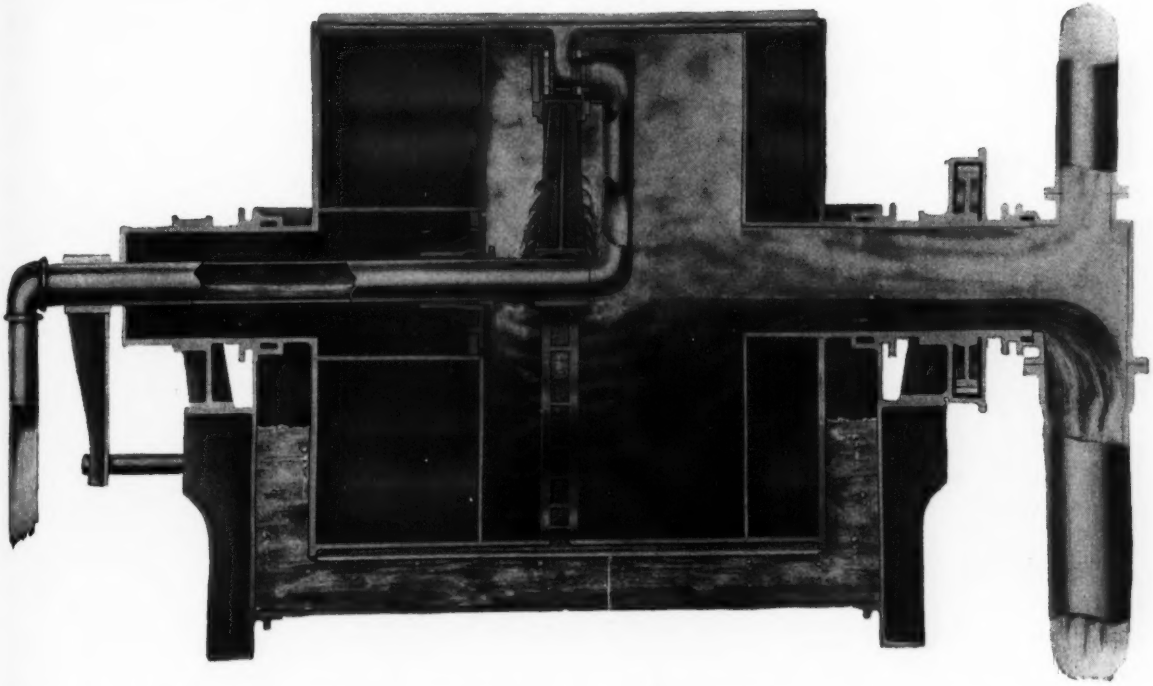


FIG. 1.
Side Elevation View of Scrubber

RING VALVE

BLACK LIQUOR PULP WASHER

Patents applied for



This new **OLIVER** Black Liquor Pulp Washer is a winner! Study of its design and principle of operation reveals several important features but perhaps the outstanding ones are:

(1) sharp separation of liquor and wash, cutting off the latter at any concentration;

(2) minimum restriction to flow from sheet to trunnion.

This is not just a blueprint filter. It's the real thing, having been put through its paces in an eastern mill over a period of several months. Results indicate new highs in capacity and washing efficiency are assured.

OLIVER UNITED FILTERS INC.

New York, N. Y.
33 West 42nd St.

Chicago, Ill.
221 N. LaSalle St.

Oakland, Calif.
2900 Glascock St.

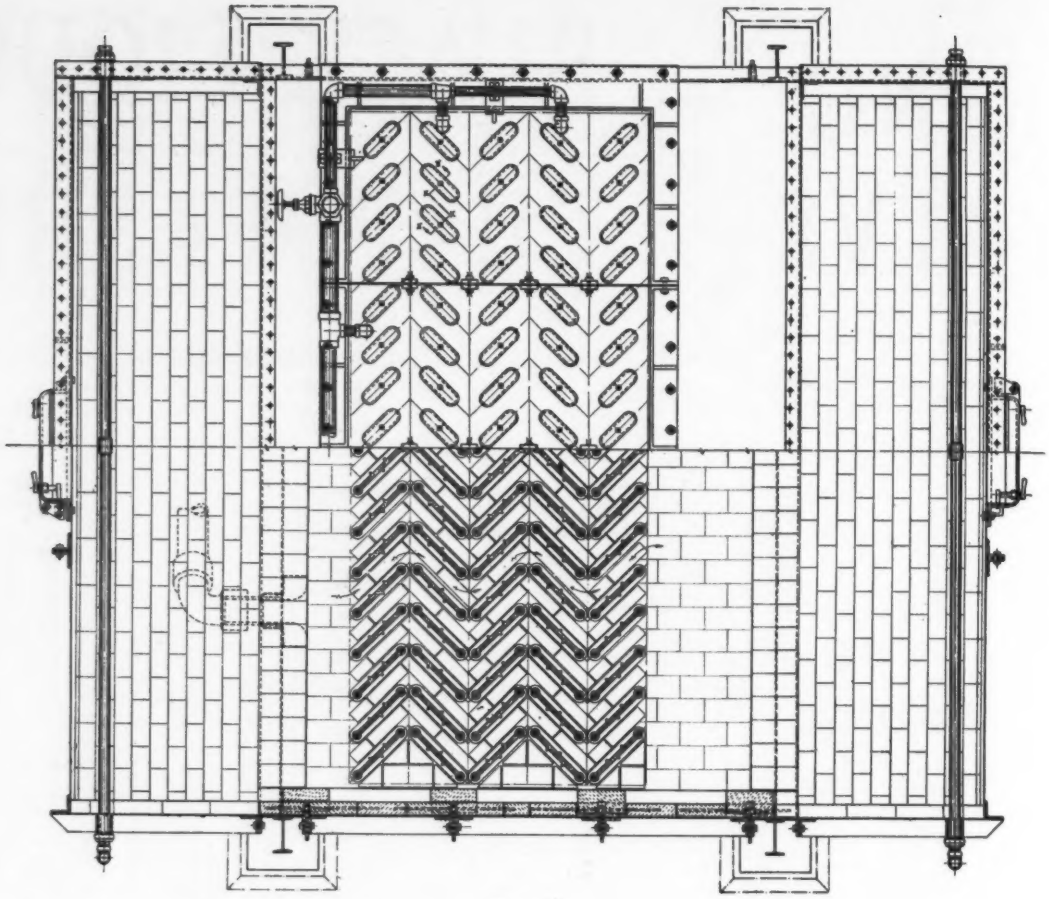


FIG. 2.
Plan View of Scrubber

arranged vertically in a zig-zag formation between two horizontal tanks and two vertical side walls constituting a horizontal tunnel. The tank (b) at the top is a shallow open reservoir into which water is fed at a constant rate through a regulating valve and a suitable pipe manifold, (c). Water from the top tank flows by gravity through metering orifices (d) Fig. 3 into the distributor boxes (e) which are integral parts of the elements.

Five orifices (f), Fig. 3, at the bottom of each distributor box disperse the water on both surfaces of each element; three orifices feeding the surface facing the gas flow and two orifices feeding the back side.

The multiple zig-zag paths between the elements, Fig. 2, produce eddies in the gas streams thus throwing dust particles out of the gas streams against the moving films of water on the surfaces of the elements, where they are trapped and washed down into the lower tank (g), Fig. 1. Water and dust particles collected in the lower tank are drained through a discharge manifold (h), into a suitable disposal system.

Materials of Construction

As a result of extensive studies under actual field conditions in parallel with accelerated laboratory tests, extruded carbon and acid-proof tile have been found the most suitable materials for scrubber service.

The sides and the bottom tanks are made of steel completely lined inside with acid-proof brick laid with "Penchlor" acid-proof cement joints. The top tank is made of cast iron sections with proper protection on the under side against the direct attack of flue gases.

The elements which are the most vulnerable parts of the scrubber subjected to corrosion, erosion and temperature shocks, are made of extruded carbon. This material has shown excellent resistance to wear under all service conditions and from all indications elements made of this material will have indefinitely long life.

The carbon sections are tied together rigidly with two enameled steel tie rods which are completely embedded in the carbon the full length of the element. The rigid elements stand on end on the flat floor of the bottom tank; the top ends are held by ribs cast on the underside of the top tank.

Dust Removal Efficiencies

Many rather elaborate tests have been conducted to determine the dust removal efficiencies of the Riley flue gas scrubber. The results of these tests have consistently indicated that at its full rating operation the scrubber eliminates better than 90 per cent by weight of all the fly ash entering the scrubber.

With a drop in operating load from 100 per cent of the scrubber rating to 50 per cent rating the dust removal efficiency gradually declines from 90 per cent to 78 per cent. This small decline in efficiency is caused mainly by the diminishing sizes of the ash particles, and by the reduced gas velocities through the scrubber producing less violent eddy currents, hence poorer separation.

Draft Loss Through Scrubber

Ordinarily scrubber sizes are selected so that at their peak load operation the draft loss will not exceed 1 inch W. G. With decreasing gas quantities the draft loss declines at an approximate square root ratio.

Drop in Flue Gas Temperatures

There is a drop in flue gas temperatures caused by the heat transfer from hot gases to relatively cold wash water. The amount of cooling depends largely on the temperature difference between the gases and the water, and the gas velocities through the washing zone.

Assuming wash water temperature at 60 deg. F., the gas temperature drop will vary from 100 to 200 deg. for entering gas temperatures varying from 350 to 500 deg.

Calculations will show that for any given installation where the scrubber is played ahead of the induced draft fan the shrinkage in gas volumes nearly compensates for the additional draft loss introduced by the scrubber. In other words, with the use of the Riley scrubber dust separation can be accomplished without additional fan power or without sacrifice in fan capacity.

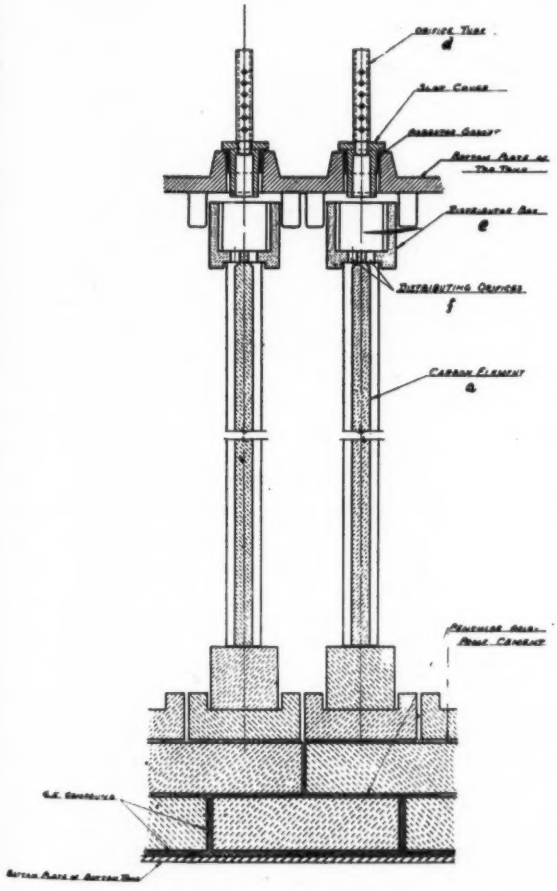


FIG. 3.
Arrangement of Elements

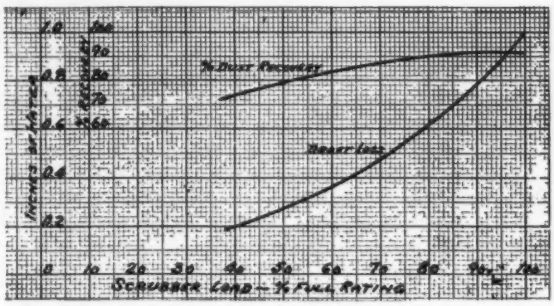


FIG. 4.
Performance Curves

Water Requirements

Since practically all existing scrubber installations are located in plants where an abundant water supply is available, no attempt has been made to determine the absolute minimum wash water requirements for various sized scrubbers. The present practice calls for approximately 2.5 gallons per minute per 1000 CFM flue gas at the full rated scrubber capacity. As a rough approximation this requirement corresponds to 1400 gallons of water per ton of coal burned or 70 gallons per 1000 lbs. of steam generated.

In existing installations sea water, or the overflow from various industrial processes has been successfully used by filtering through suitable screens. It is necessary to reduce the sizes and the quantities of suspended matters in the wash water to such a degree that they will not cause clogging of the orifices feeding the elements.

The materials used in the construction of the elements and the inside lining of the housing are inert to flue acids, hence the effluent water can be recirculated after settling out the ash. This will reduce the water requirement to a minimum corresponding to the necessary make-up for losses in the settling tank and for the evaporation in the scrubber. Such a recirculating system requires acid-proof equipment for handling the corrosive effluence. A paper plant is not likely to require such rigid economy of water, hence it would be of no particular interest here to elaborate on the problems of a recirculating wash water system serving a flue gas scrubber.

Moisture Pick-Up

The aforementioned heat exchange between hot gases and cold wash water is largely accounted for as sensible heat in the effluent water. A relatively small percentage of the heat is taken up as latent heat by the water vapor picked up by the gases.

Tests have shown that the amount of moisture picked up from the wash water by the flue gases is less than half of the moisture already contained in the gaseous products of combustion of coal containing 4 to 5 per cent hydrogen and 5 to 10 per cent moisture.

The effect of this additional water vapor on the

dew point temperatures of the flue gases at the scrubber outlet would be a rise of approximately 10 to 25 deg. F. based on the saturation curves for pure air and water vapor.

Acid Pick-Up in Wash Water

All of the sulphur trioxide (SO_3) present in flue gases, and a small percentage of the sulphur dioxide (SO_2) are absorbed in the scrubber by ordinary untreated wash water. Tests have indicated that the amount of sulphur in the gases thus eliminated constitutes a very small percentage of the total sulphur content in an average coal.

Operation and Maintenance

The operating routine of a scrubber involves the periodic sluicing of the inlet and outlet slopes and a periodic inspection of the water pump serving the scrubber, if a separate pump is used. Depending on the water conditions, the water distributing orifices may require occasional inspection and cleaning during shut-down periods.

The operating expense involves the pump power for lifting the wash water from its source to the elevation of the scrubber tank. In rare cases where there is no natural drainage a sluice pump is maintained for the removal of the sludge.

With the use of inert materials inside the scrubber the maintenance on the working parts is practically eliminated. Carbon elements that have been in continuous service for more than three years have shown no signs of wear or deterioriation. The acid-proof stoneware lining inside the housing has shown equal resistance during the same period of service.

Celotex Corp. Faces Charges

WASHINGTON, D. C., November 29, 1939—The Federal Trade Commission has issued a complaint charging The Celotex Corporation, Chicago, with violation of Section 7 of the Clayton Act through its acquisition of the capital stock of Certain-teed Products Corporation, New York, a competitor.

As of January 1, 1938, the Celotex Corporation, according to the complaint, was the country's largest manufacturer of structural insulation and acoustical material and the only manufacturer of such material from cane fiber with factories located in the United States proper. It also manufactures, through a subsidiary corporation, acoustical and architectural products such as plaster and gypsum wall board from rock slag. Selling its products under the trade names "Celotex", "Acousti-Celotex" and "Calicel," its total gross sales during the year ending October 31, 1937, were approximately $13,000,000.

The complaint recites that the only other manufacturer of structural insulation and acoustical material from cane fiber selling in this country is Hawaiian Cane Products, Ltd., Hilo, Hawaii, which had sold its products in the United States through Certain-teed Products Corporation and two other companies, such sales amounting in 1937 to approximately $1,000,000.

As of December 31, 1937, the complaint continues, the Celotex Corporation had an authorized capitalization including: (1) 750,000 shares of common stock, no par value (stated value $1 per share), which was increased in January 1938 to 1,500,000 shares, no par value (stated value $1 per share), and (2) 100,000 shares of preferred stock, par value $100 per share. Of these holdings, there was issued and outstanding as of March 9, 1938, 268,685 shares of common stock and 29,072½ shares of preferred stock.

Certain-teed Products Corporation, the complaint continues, as of January 1, 1938, had an authorized capitalization of $19,699,600, par value, consisting of 186,996 shares of 6% cumulative prior preference stock of a par value of $100 each, and 1,000,000 shares of common stock of a par value of $1 each. As of December 31, 1937, there was issued and outstanding 73,069.3 shares of preferred and 625,340 shares of common stock. Prior to January 1, 1938, this company had been engaged in the manufacture and sale of asphalt roofing and kindred products, wood fiber insulating board, gypsum wall board and similar products, together with the cane fiber insulating board manufactured for it by Hawaiian Cane Products, Ltd., and other building materials manufactured by others. The Certain-teed company's net sales for 1937 amounted to approximately $16,500,000, of which about $4,000,000 represented gypsum products, about $450,000 represented wood fiber insulating board, and approximately $650,000 represented cane fiber insulating board.

The complaint alleges that about January 1, 1938, the Celotex Corporation acquired from the Phoenix Securities Corporation 9,946 shares of the outstanding preferred stock and 19,360 shares of the outstanding common stock of the Certain-teed Products Corporation, and as consideration therefor, issued 43,744 shares of its own common stock and paid approximately $569,760 in cash. About March 1, 1939, the complaint alleges, the Celotex Corporation acquired from the General Investment Corporation and others approximately 40,000 additional shares of Certain-teed common stock for approximately $550,000 in cash and securities.

Acquisition by Celotex of Certain-teed's capital stock allegedly had the effect of substantially lessening competition in interstate commerce between the two companies; of restraining interstate commerce in the sale of structural insulation and acoustical material, including fiber and gypsum products, in certain parts of the country, and of tending to create a monopoly in the Celotex Corporation in the sale of such products.

The complaint grants the respondent company 20 days for filing answer.

Italy Restricts Papers To Four Pages

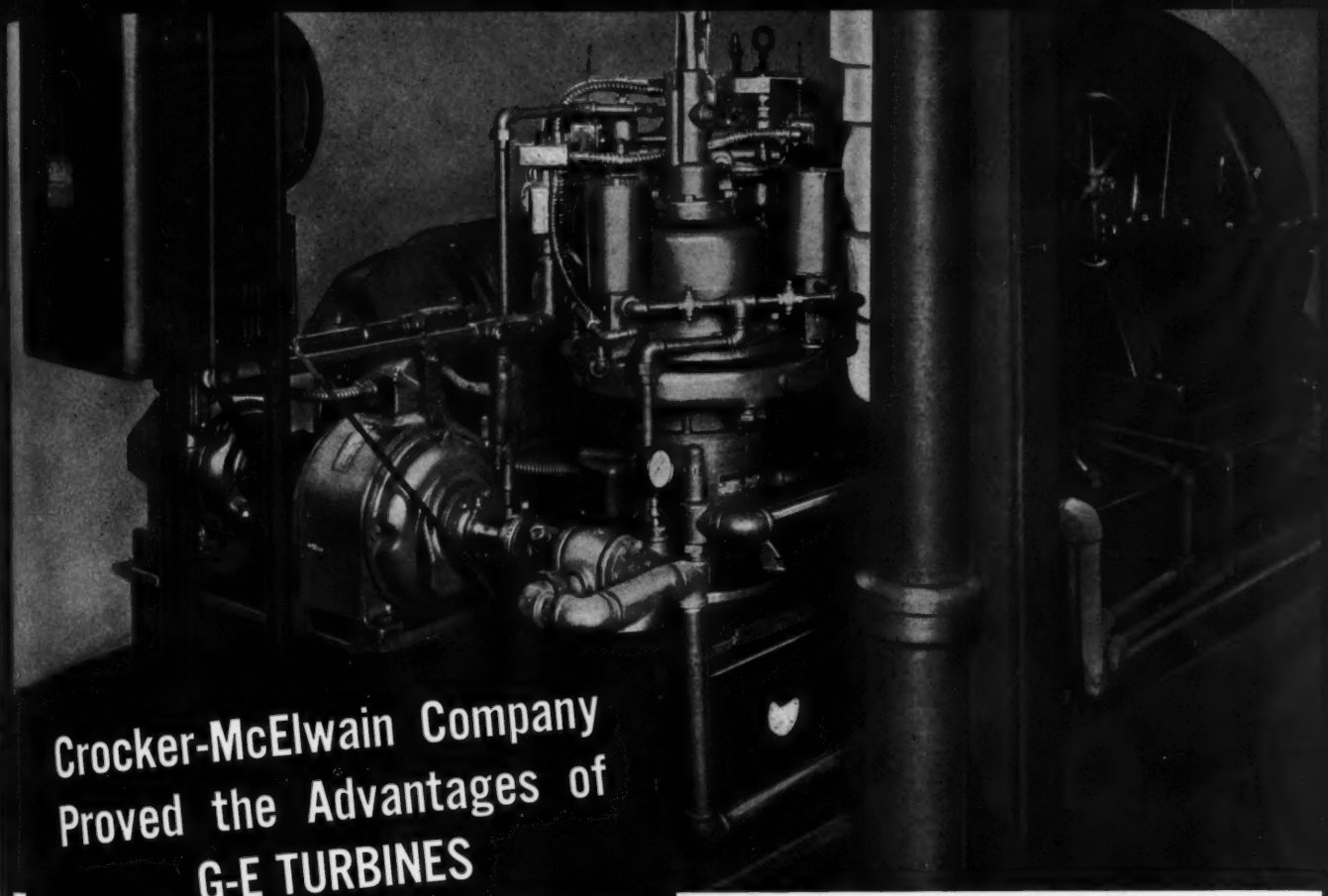
[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 27, 1939—The volume of individual daily newspaper editions in Italy were restricted to 4 pages, according to a report from the office of the American Commercial Attache in Rome.

This measure has been taken for the purpose of limiting the consumption of wood pulp. It is pointed out that during the first 6 months of the current year Italy's import of mechanical wood pulp for paper making totaled 1,300 metric tons, and of chemical pulp 63,153 tons, not including imports for the manufacture of rayon and staple fiber.

The total reported domestic production during the same period amounted to 76,559 tons of mechanical pulp and 25,238 tons of chemical wood pulp for all purposes.

BOTHERED WITH SPEED "DRIFT"—PRODUCTION PROBLEMS?



Crocker-McElwain Company Proved the Advantages of G-E TURBINES for Paper-machine Drive

Photograph courtesy Crocker-McElwain Co., Holyoke, Mass.

SPEED RANGE: With the electric governor it is possible to design for any speed range up to 24 to 1. Thus, the same machine can readily produce paper of different weights. Job-mill operators find this feature a profitable solution of their below-normal production period problem.

SIMPLE OPERATION: A single push-button station is the only manual control. Speed changes are made with this station quickly and easily.

IF your problem is to get the best turbine speed control for paper-machine drive—to eliminate speed "drift" and all supposedly unavoidable inaccuracies in paper production—take a tip from the Crocker-McElwain Company, Holyoke, Massachusetts.

Crocker-McElwain put in a General Electric turbine for paper-machine drive equipped with a G-E governor. Since this unit was installed, there's been no evidence of speed "drift." Uniformity of paper quality has been easily maintained. Poor regulation has been eliminated. Small wonder that the plant engineer is enthusiastic about G-E turbines.

G-E turbines equipped with G-E governors are designed to provide constant speed at any point within the speed range of the turbine. Change of speed can be made with little loss of production. Moreover, they offer low maintenance costs, reduced paper breakage, and better uniformity of product.

For details concerning the electric governor and turbines for paper mills, consult the turbine specialist at the nearest G-E office. He will be glad to help you. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

720-308

Joint Printing Committee Opens Paper Bids

Twenty-Nine Concerns As Compared With Thirty-Two In May Submitted Bids For Supplying Government Printing Office With 46,677,000 Pounds of Paper For Six Months—Bids Are 10 To 15 Per Cent Higher.

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 29, 1939—Bids were received on Monday by the Joint Congressional Committee on Printing for 46,677,000 pounds of paper for a six months supply for the use of the Government Printing Office for the period beginning January 1. Bids were received from 29 firms. The bids were from 10 to 15 per cent higher than those received for the last opening in May. The Joint Committee will meet on December 4 to consider awards. The bids received were as follows:

Newsprint

No. 1—1,500,000 lbs., 24x36—64; rolls, 24, 36, and 48 ins. wide (3-inch fiber cores, weight of cores and wrappers shall be included in net weight.)

National Pulp & Paper Co.	2.50c
Old Dominion Paper Co.	3.2839c
Paper Corp. of U. S.	3.42c

Machine-Finish Book

No. 3—500,000 lbs., 25x38—70; flat, cut 24x32, 28x38, and 31¼x45½ ins.

Stanford Paper Co.	5.79c
Whitaker Paper Co.	5.31c
Graham Paper Co.	6.42c
Barton, Duer & Koch Paper Co.	5.72c

No. 4—600,000 lbs., 25x38—70; flat, cut 24x38 and 38x48 ins.

Stanford Paper Co.	5.79c
Whitaker Paper Co.	5.31c
Graham Paper Co.	6.42c
Barton, Duer & Koch Paper Co.	5.12c

No. 5—600,000 lbs., 25x38—70; flat, cut 24x38 and 38x48 ins.

R. P. Andrews Paper Co.	5.07c
Stanford Paper Co.	5.79c
Whitaker Paper Co.	5.31c
Barton, Duer & Koch Paper Co.	5.54c
Marquette Paper Co.	6.38c

No. 6—500,000 lbs., 25x38—70; flat, 18, 21, and 28½ ins. wide (3-inch fiber cores).

Perkins-Goodwin Co.	5.14c
Stanford Paper Co.	5.28c
Fitchburg Paper Co.	5.02c
Whitaker Paper Co.	4.96c
Mudge Paper Co.	4.93c
Graham Paper Co.	5.80c
Barton, Duer & Koch Paper Co.	5.12c

No. 7—600,000 lbs., 25x38—70; rolls, 19 and 38 ins. wide (3-inch fiber cores).

Perkins Goodwin Co.	5.14c
R. P. Andrews Paper Co.	4.73c
Stanford Paper Co.	5.28c
Fitchburg Paper Co.	5.02c
Whitaker Paper Co.	4.96c
Mudge Paper Co.	4.93c
Barton, Duer & Koch Paper Co.	4.78c
Frank Parsons Paper Co.	4.61c
Marquette Paper Co.	5.78c

No. 8—500,000 lbs., 25x38—70; rolls, 19 and 38 ins. wide (3-inch fiber cores).

Perkins-Goodwin Co.	5.14c
R. P. Andrews Paper Co.	4.73c
Stanford Paper Co.	5.28c
Fitchburg Paper Co.	5.02c
Whitaker Paper Co.	4.96c
Mudge Paper Co.	4.93c
Graham Paper Co.	5.80c
Barton, Duer & Koch Paper Co.	5.08c
Frank Parsons Paper Co.	4.61c

No. 9—400,000 lbs., 25x38—70; rolls, 24, 36, and 48 ins. wide (3-inch fiber cores).

Perkins-Goodwin Co.	5.14c
R. P. Andrews Paper Co.	4.73c
Stanford Paper Co.	5.28c
Fitchburg Paper Co.	5.02c
Whitaker Paper Co.	4.96c
Mudge Paper Co.	4.93c
Barton, Duer & Koch Paper Co.	5.02c
Marquette Paper Co.	5.78c

No. 10—50,000 lbs., 25x38—80; rolls, 32 ins. wide (3-inch fiber cores).

Stanford Paper Co.	8.00c
Whitaker Paper Co.	5.43c
Barton, Duer & Koch Paper Co.	5.54c
Marquette Paper Co.	6.03c

No. 11—400,000 lbs., 25x38—80; flat, cut 24x38, 33¾x64, and 38x48 ins.

Perkins-Goodwin Co.	5.33c
R. P. Andrews Paper Co.	4.73c
Stanford Paper Co.	5.39c
Whitaker Paper Co.	4.93c
Barton, Duer & Koch Paper Co.	5.40c
Frank Parsons Paper Co.	4.98c
Marquette Paper Co.	6.125c

No. 12—400,000 lbs., 25x38—100; flat, cut 22¼x32¼, 24x38, 24¼x36¼, 31½x48, 32x42, 38x48 and 41x52 ins.

Perkins-Goodwin Co.	5.07c
R. P. Andrews Paper Co.	4.58c
Stanford Paper Co.	5.09c
Cauthorne Paper Co., Inc.	5.67c
Whitaker Paper Co.	4.68c
Barton, Duer & Koch Paper Co.	5.08c
Frank Parsons Paper Co.	4.98c

No. 13—10,000 lbs., 25x38—120 and 140; flat, cut 29x41, 32x52, and 38x48 ins. Min. order 5,000 lbs.

Stanford Paper Co.	5.33c

No. 14—15,000 lbs., blue and salmon, 25x38—70 and 100; flat, cut 25x38 and 38x48 ins. Min. order, one color, 5,000 lbs.

Stanford Paper Co.	70 lbs.	10.00c
	100 lbs.	9.50c

Machine-Finish Book End Paper

No. 15—36,000 lbs., for waste leaves; flat, cut 25x38—160; the grain to run the 38-inch way.

R. P. Andrews Paper Co.	5.28c
Walker-Goulard-Plehn Co.	7.18c
Old Dominion Paper Co.	5.75c
Barton, Duer & Koch Paper Co.	6.00c

Offset Book

No. 16—500,000 lbs., 25x38—120; flat, cut 24x38, 25x38, 26x32, 28x40, and 38x48 ins.; grain as ordered.

R. P. Andrews Paper Co.	5.73c
Cauthorne Paper Co., Inc.	6.30c
Whitaker Paper Co.	5.39c
Aetna Paper Co.	6.493c
Frank Parsons Paper Co.	5.584c
Mathers-Lamm Paper Co.	5.60c
Paper Corp. of U. S.	6.28c

Antique Book

No. 17—500,000 lbs., 25x38—100 and 120 flat, cut 33x43, and 38x50 ins.

Perkins-Goodwin Co.	5.07c
R. P. Andrews Paper Co.	4.49c
Stanford Paper Co.	5.06c
Cauthorne Paper Co., Inc.	5.67c
Old Dominion Paper Co.	5.41c
Whitaker Paper Co.	5.11c
Barton, Duer & Koch Paper Co.	5.62c
Aetna Paper Co.	6.023c

Lightweight Machine-Finish Book

No. 18—40,000 lbs., 25x38—60; flat, cut 32x48 and 38x48 ins.

Stanford Paper Co.	6.52c

50 Per Cent Rag Lightweight Machine-Finish Book

No. 19—40,000 lbs., 25x38—60; flat, cut 32x48 and 38x48 ins.

Mathers-Lamm Paper Co.	12.28c

50 Per Cent Rag Antique Book

No. 20—120,000 lbs., 25x38—80; flat, cut 32x48 and 38x48 ins.

Old Dominion Paper Co.	8.76c
Whitaker Paper Co.	11.79c
Aetna Paper Co.	8.813c
Paper Corp. of U. S.	9.28c

No. 21—60,000 lbs., 25x38—80; flat, cut 22¾x31½, 29x41 and 31½x45½ ins.

Old Dominion Paper Co.	8.76c
Whitaker Paper Co.	11.79c
Aetna Paper Co.	8.813c
Paper Corp. of U. S.	9.28c

No. 22—120,000 lbs., 25x38—90; flat, cut any size, min. width 24 ins., max. width 42 ins.

Old Dominion Paper Co.	8.66c
Whitaker Paper Co.	11.54c
Aetna Paper Co.	8.693c
Paper Corp. of U. S.	9.12c

75 Per Cent Rag Laid Antique Book

No. 23—10,000 lbs., 25x38—140; flat, cut 24x38 and 29x41 ins.; the laid marks to run the 24-inch and 29-inch direction of the sheet; the grain and chain marks to run lengthwise of the sheet.

R. P. Andrews Paper Co.	10.92c
Whitaker Paper Co.	15.89c
Barton, Duer & Koch Paper Co.	13.87c
Aetna Paper Co.	10.883c
Paper Corp. of U. S.	11.54c

100 Per Cent Rag Antique Book

No. 24—5,000 lbs., 25x38—90; flat, cut 24x38 and 38x48 ins.; the grain to run lengthwise of the sheet. Min. order 5,000 lbs.

R. P. Andrews Paper Co.	17.63c
Barton, Duer & Koch Paper Co.	17.32c
Lee Paper Co.	17.50c
Paper Corp. of U. S.	15.45c

No. 25—15,000 lbs., 25x38—140; flat, cut 24x38 and 38x48 ins.; the grain to run lengthwise of the sheet. Min. order 10,000 lbs.

R. P. Andrews Paper Co.	16.93c
Barton, Duer & Koch Paper Co.	16.83c
Lee Paper Co.	17.50c
Paper Corp. of U. S.	15.45c

Supercalendered Book

No. 26—700,000 lbs., 25x38—90; flat,

p&h ELECTRIC CRANES

● To answer the material handling problems peculiar to the paper industry, P&H builds a special type of crane, compact and accessible—with an unusually high factor of safety and reserve capacity. Preference for P&H paper mill cranes has resulted in a large volume which permits the building of certain standard types on a production basis. Thus, P&H crane users benefit both in first cost and in the purchase of parts and accessories. For literature address the Harnischfeger Corporation, 4560 W. National Ave., Milwaukee, Wis.

ALL CAPACITIES FROM 5 TO 300 TONS

AMERICA'S OLDEST AND ONLY CRANE BUILDER PRODUCING COMPLETE ELECTRICAL CRANE EQUIPMENT

HARNISCHFEGER CORPORATION

ELECTRIC CRANES • EXCAVATORS • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

cut 31¼x45½, 32x48, 34x44, 38x48 and 39x50 ins.

R. P. Andrews Paper Co.	4.84c
Whitaker Paper Co.	5.68c

No. 27—300,000 lbs., 25x38—100; flat cut 38x48 ins.

Perkins-Goodwin Co.	5.32c
R. P. Andrews Paper Co.	4.84c
Stanford Paper Co.	5.46c
Whitaker Paper Co.	5.43c
Frank Parsons Paper Co.	4.87c

No. 28—200,000 lbs., 25x38—120 and 140; flat, cut 35x45, 38x48, 38x50, and 38x51 ins.

R. P. Andrews Paper Co.	4.84c
Stanford Paper Co.	5.46c
Whitaker Paper Co.	5.37c

No. 29—80,000 lbs., 25x38—90; rolls, 28½ and 38 ins. wide (3-inch fiber cores).

Whitaker Paper Co.	5.33c

No. 30—500,000 lbs., 25x38—100; rolls, 38 ins. wide (3-inch fiber cores).

R. P. Andrews Paper Co.	4.33c
Stanford Paper Co.	5.11c
Whitaker Paper Co.	5.08c
Mudge Paper Co.	5.18c
Frank Parsons Paper Co.	4.61c

No. 31—500,000 lbs., 25x38—100; rolls, 38 ins. wide (3-inch fiber cores).

R. P. Andrews Paper Co.	4.33c
Stanford Paper Co.	5.11c
Whitaker Paper Co.	5.08c
Mudge Paper Co.	5.18c

Coated Book

No. 36—700,000 lbs., 25x38—140 and 160; flat, cut 24x32, 24x38, 29x41, 38x48, 38x50 and 39x51 ins.; the grain to run lengthwise of the sheet.

Stanford Paper Co.	7.09c
Whitaker Paper Co.	6.79c
Mudge Paper Co.	6.98c
Virginia Paper Co.	7.12c
Graham Paper Co.	7.20c
Barton, Duer & Koch Paper Co.	7.13c

50 Per Cent Rag Coated Book

No. 37—20,000 lbs., 25x38—140 and 160; flat, 38x48 ins.; the grain to run lengthwise of the sheet.

Stanford Paper Co.	12.00c
Virginia Paper Co.	13.01c
Graham Paper Co.	13.15c
Barton, Duer & Koch Paper Co.	13.00c

50 Per Cent Rag Machine-Finish Lithograph

No. 40—30,000 lbs., 25x38—160; flat, cut 26x38 ins., the grain to run lengthwise of the sheet.

R. P. Andrews Paper Co.	10.93c
Walker-Goulard-Plehn Co.	12.87c
Whitaker Paper Co.	12.28c
Mudge Paper Co.	9.57c
Graham Paper Co.	11.68c
Aetna Paper Co.	9.983c
Paper Corp. of U. S.	10.13c

Mimeograph, White and Colored

No. 43—800,000 lbs., white, Nos. 40 and 48; flat, cut 24½x30½, 24½x32, 24½x38, 26x42½, and 28½x34½ ins.; the grain to run lengthwise of the sheet.

Perkins-Goodwin Co.	5.09c
R. P. Andrews Paper Co.	4.59c
Cauthorne Paper Co., Inc.	5.67c
Whitaker Paper Co.	4.48c
Barton, Duer & Koch Paper Co.	5.19c
Marquette Paper Co.	5.98c

No. 44—200,000 lbs., blue, buff, green, pink and yellow, No. 40; flat, cut 24½x30½, 24½x32, 24½x38 and 26x42½ ins.; the grain to run lengthwise of the sheet. Min. order, one color, 10,000 lbs.

Cauthorne Paper Co., Inc.	6.07c

25 Per Cent Rag Mimeograph

No. 47—3,000,000 lbs., Nos. 40 and 48; flat, cut 24½x30½, 24½x32, 24½x38, 26x42½, and 28½x34½ ins.; the grain to run lengthwise of the sheet.

Old Dominion Paper Co.	7.32c
Aetna Paper Co.	7.233c
Paper Corp. of U. S.	7.189c

Blue U S M O Safety Writing

No. 51—400,000 lbs., No. 32; rolls, 22 ins. wide, 24 ins. in diameter (3-inch fiber cores).

George La Monte & Sons	10.71c
R. P. Andrews Paper Co.	10.57c

U S M O Writing, White and Blue

No. 52—8,000 lbs., No. 32; rolls, 8½ inches wide, 24 ins. in diameter 3-inch fiber cores). Min. order, either color, 4,000 lbs.

R. P. Andrews Paper Co.	White 9.65c Blue 10.30c

Safety Writing, Colored

No. 53—4,000 lbs., blue, gray, green, pink salmon, and yellow, No. 40; flat, cut 17x28, 21x32, and 22x34 ins. Min. order, one color, 2,000 lbs.

R. P. Andrews Paper Co.	12.75c
Stanford Paper Co.	12.32c
Whitaker Paper Co.	11.95c
Mathers-Lamm Paper Co.	12.85c

Sulphite Writing, White and Colored

No. 54—200,000 lbs., white, No. 26; flat, cut 32x42 ins.

Perkins-Goodwin Co.	5.74c
R. P. Andrews Paper Co.	6.27c
Cauthorne Paper Co., Inc.	6.21c
Barton, Duer & Koch Paper Co.	6.85c
Graham Paper Co.	6.27c

No. 55—2,500,000 lbs., white, No. 32; flat, cut any size, min. width 21 ins., max. width 34 ins.

Perkins-Goodwin Co.	4.96c
R. P. Andrews Paper Co.	6.12c
Cauthorne Paper Co., Inc.	6.21c
Whitaker Paper Co.	4.73c
Barton, Duer & Koch Paper Co.	5.47c
Marquette Paper Co.	6.13c
Graham Paper Co.	6.12c

No. 56—4,000,000 lbs., white, Nos. 40 and 48; flat, cut any size, min. width 21 ins., max. width 41 ins.

Perkins-Goodwin Co.	4.84c
R. P. Andrews Paper Co.	5.87c
Cauthorne Paper Co., Inc.	6.21c
Whitaker Paper Co.	4.73c
Graham Paper Co.	5.90c
Barton, Duer & Koch Paper Co.	5.33c
Marquette Paper Co.	5.83c

No. 57—60,000 lbs., white, No. 26; rolls, min. width 16 ins., max. width 38 ins. (3-inch fiber cores).

Perkins-Goodwin Co.	5.39c
R. P. Andrews Paper Co.	5.62c
Cauthorne Paper Co., Inc.	7.42c
Graham Paper Co.	5.62c
Barton, Duer & Koch Paper Co.	6.56c

No. 58—1,000,000 lbs., white, No. 32; rolls, min. width 16 ins., max. width 38 ins. (3-inch fiber cores).

Perkins-Goodwin Co.	4.57c
R. P. Andrews Paper Co.	5.39c
Cauthorne Paper Co., Inc.	5.97c
Old Dominion Paper Co.	5.56c
Whitaker Paper Co.	4.44c
Graham Paper Co.	5.41c
Barton, Duer & Koch Paper Co.	5.01c

No. 59—40,000 lbs., white, Nos. 40 and 48; rolls, min. width 16 ins., max width 38 ins. (3-inch fiber cores).

Perkins-Goodwin Co.	4.69c
R. P. Andrews Paper Co.	5.41c
Cauthorne Paper Co., Inc.	5.97c
Whitaker Paper Co.	4.44c
Graham Paper Co.	5.41c
Barton, Duer & Koch Paper Co.	5.33c

No. 60—100,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 26; flat, cut any size, min. width 21 ins., max. width 34 ins. Min. order, one color, 5,000 lbs.

R. P. Andrews Paper Co.	6.43c
Cauthorne Paper Co.	8.15c
Graham Paper Co.	6.43c

No. 61—1,500,000 lbs., blue, buff, cherry, green, pink, salmon and yellow Nos. 32 and 40; flat, cut any size, min. width 21 ins., max. width 34 ins. Min. order, one color, 10,000 lbs.

R. P. Andrews Paper Co.	6.19c
Cauthorne Paper Co., Inc.	6.69c
Old Dominion Paper Co.	6.1289c
Graham Paper Co.	6.22c
Barton, Duer & Koch Paper Co.	6.55c
Aetna Paper Co.	6.943c
Marquette Paper Co.	6.37c

100 Per Cent Rag White Writing

No. 63—2,500 lbs., No. 56; flat, cut 21x32 ins. Min. order 2,500 lbs.

R. P. Andrews Paper Co.	23.03c
Stanford Paper Co.	19.40c
Barton, Duer & Koch Paper Co.	21.95c

Lithograph-Finish Map

No. 64—10,000 lbs., Nos. 32 and 40; flat, cut 24x38, 30x40, 32x48, 36x52, and 38x48 ins. Min. order, one substance, 5,000 lbs.

No bid.

50 Per Cent Rag Lithograph-Finish Map

No. 65—120,000 lbs., Nos. 40, 48 and 56; flat, cut any size, min. width 22 ins., max. width 48 ins.; the grain to run lengthwise of the sheet.

R. P. Andrews Paper Co.	12.23c
Walker-Goulard-Plehn Co.	12.87c
Stanford Paper Co.	10.48c
Barton, Duer & Koch Paper Co.	10.08c
Aetna Paper Co.	10.263c
Mathers-Lamm Paper Co.	10.55c

75 Per Cent Rag Lithograph-Finish Map

No. 66—80,000 lbs., Nos. 32 and 40; flat, cut any size, min. width 24 ins., max. width 48 ins.; the grain to run lengthwise of the sheet.

R. P. Andrews Paper Co.	15.03c
Mudge Paper Co.	11.79c
Virginia Paper Co.	14.36c
Barton, Duer & Koch Paper Co.	11.78c
Aetna Paper Co.	11.973c

No. 67—100,000 lbs., Nos. 48 and 56; flat, cut any size, min. width 30 ins., max. width 48 ins.; the grain to run lengthwise of the sheet. Min. order, one substance, 5,000 lbs.

R. P. Andrews Paper Co.	14.19c
Mudge Paper Co.	11.57c
Virginia Paper Co.	14.56c
Barton, Duer & Koch Paper Co.	11.67c
Aetna Paper Co.	11.973c

100 Per Cent Rag White Chart, Lithograph-Finish

No. 69—200,000 lbs., Nos. 83 and 96; flat, cut any size, min. width 22 ins., max. width 46 ins.; packed in cases of 1,000 sheets each; the grain to run lengthwise of the sheet unless otherwise specified.

R. P. Andrews Paper Co.	18.12c
Barton, Duer & Koch Paper Co.	15.96c
Lee Paper Co.	24.16c
Paper Corp. of U. S.	18.47c

Sulphite Manifold, White and Colored

No. 70—200,000 lbs., white, No. 18; flat, cut 21x32, 22x34, and 28x34 ins.; the grain to run the 21-inch way on the 21x32-inch size.

Import Paper Co.	7.75c
Old Dominion Paper Co.	7.984c
Whitaker Paper Co.	8.56c

AMYLIQ

THE PERFECTED LIQUEFYING AGENT FOR CORN AND OTHER STARCHES

—Produces better tub sizing and coating formulas from low-priced starches . . . . .

AMYLIQ starch solutions and pastes are uniform. They have maximum sizing and adhesive value because the starch has been liquefied without being broken down into sugars. AMYLIQ conversions are conveniently done in the mill's starch tubs or cookers. No expensive equipment is required. The method is so simple that ordinary workmen handle it without the slightest difficulty. AMYLIQ is a stable preparation of standardized activity and can be relied upon to give consistent results.

With AMYLIQ, mills are not dependent upon any particular kinds of starches or gums. It can be used to convert any of the commercially available raw starches. Purchasers are consequently in a better position to take advantage of price differentials and are often able to effect remarkable savings.

Our Technical Division will be glad to assist in matching your present formulas or developing new ones.

WALLERSTEIN COMPANY, INC. 180 MADISON AVE., NEW YORK

No. 71—80,000 lbs., blue, buff, green, pink, salmon and yellow, No. 18; flat, cut 21x32, 22x34, and 28x34 ins.; the grain to run the 21-inch way on the 21x32-inch size. Min. order, one color, 5,000 lbs.

Import Paper Co.	8.50c
Old Dominion Paper Co.	8.977c
Whitaker Paper Co.	9.56c

50 Per Cent Rag Manifold, White and Colored

No. 73—80,000 lbs., white, No. 14; flat, cut 21x32, 22x34, 28x34 and 38x48 ins.; the grain to run the 21-inch way on the 21x32-inch size. Min. order, 5,000 lbs.

R. P. Andrews Paper Co.	16.63c
Stanford Paper Co.	16.73c
Barton, Duer & Koch Paper Co.	17.15c
Marquette Paper Co.	14.68c

No. 74—600,000 lbs., white, No. 18; flat, cut 21x32, 22x34, 24x38 and 28x34 ins.; the grain to run the 21-inch way on the 21x32-inch size.

Stanford Paper Co.	11.83c
	12.75c
Mudge Paper Co.	12.08c
	12.58c
Barton, Duer & Koch Paper Co.	12.83c
	14.05c
Marquette Paper Co.	13.50c

No. 75—20,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 14; flat, cut 21x32, 22x34, and 28x34 ins.; the grain to run the 21-inch way on the 21x32-inch size. Min. order, one color, 3,000 lbs.

R. P. Andrews Paper Co.	21.33c
Barton, Duer & Koch Paper Co.	18.13c
Marquette Paper Co.	17.43c

No. 76—120,000 lbs., blue, buff, cherry, green, pink, salmon and yellow. No. 18; flat, cut 21x32, 22x34, 24x38 and 28x34 ins.; the grain to run the 21-inch way on the 21x32-inch size. Min. order, one color, 5,000 lbs.

Barton, Duer & Koch Paper Co.	14.35c
Marquette Paper Co.	14.50c
Lee Paper Co.	12.69c

100 Per Cent Rag White Manifold

No. 78—5,000 lbs., No. 14; flat, cut 17x28, 19x24, 21x32, and 22x34 ins.; the grain to run the 21-inch way on the 21x32-inch size. Min. order, 5,000 lbs.

R. P. Andrews Paper Co.	27.53c
Old Dominion Paper Co.	26.99c
Whitaker Paper Co.	30.50c
Barton, Duer & Koch Paper Co.	26.50c

No. 79—30,000 lbs., No. 18; flat, cut 17x28, 19x24, 21x32 and 22x34 ins.; the grain to run the 21-inch way on the 21x32 ins. size. Min. order 5,000 lbs.

R. P. Andrews Paper Co.	24.93c
Old Dominion Paper Co.	20.948c
Whitaker Paper Co.	28.50c
Barton, Duer & Koch Paper Co.	22.35c
Lee Paper Co.	28.00c

50 Per Cent Rag White Glazed Manifold

No. 83—200,000 lbs., No. 16; flat cut 19x24 and 21x32 ins.; the grain to run the 21-inch way on the 21x32-inch size. Min. order 20,000 lbs.

R. P. Andrews Paper Co.	17.40c
Barton, Duer & Koch Paper Co.	14.23c
	14.43c
Lee Paper Co.	21.96c

Sulphite White Bond

No. 102—1,000,000 lbs., No. 40; flat, cut any size, min. width 21 ins.; max. width 37 ins.

R. P. Andrews Paper Co.	5.93c
Walker-Goulard-Plehn Co.	6.38c
Old Dominion Paper Co.	6.14c
Whitaker Paper Co.	6.21c
Mudge Paper Co.	5.84c
Graham Paper Co.	5.97c
Barton, Duer & Koch Paper Co.	5.69c
Marquette Paper Co.	6.11c

25 Per Cent Rag Bond, White and Colored

No. 109—300,000 lbs., white, No. 26; flat, cut any size, min. width 21 ins.; max. width 34 ins.

Baxter Paper Co.	11.45c
Graham Paper Co.	10.46c
Barton, Duer & Koch Paper Co.	10.15c
Aetna Paper Co.	9.433c

No. 110—300,000 lbs., white, No. 32; flat, cut any size, min. width 21 ins., max. width 34 ins.

Graham Paper Co.	9.55c
Barton, Duer & Koch Paper Co.	8.85c
Aetna Paper Co.	8.043c

No. 111—1,300,000 lbs., white, No. 40; flat, cut any size, min. width 21 ins., max. width 34 ins.

Butler Co.	8.54c
Barton, Duer & Koch Paper Co.	8.25c
Aetna Paper Co. 250 tons	7.393c
Balance	8.183c

No. 112—1,300,000 lbs., white, No. 40; flat, cut any size, min. width 21 ins., max. width 34 ins.

Butler Co.	8.34c
Barton, Duer & Koch Paper Co.	8.20c
Aetna Paper Co. 250 tons	7.393c
Balance	8.183c

No. 113—500,000 lbs., white, No. 48; flat, cut any size, min. width 21 ins., max. width 34 ins.

Butler Co.	8.57c
Mudge Paper Co.	8.48c
Baxter Paper Co.	8.25c
Barton, Duer & Koch Paper Co.	8.15c
Aetna Paper Co.	7.483c

No. 114—200,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 26; flat, cut any size, min. width 21 ins., max. width 34 ins. Min. order, one color, 5,000 lbs.

Stanford Paper Co.	9.98c
Barton, Duer & Koch Paper Co.	10.55c
Aetna Paper Co.	9.743c

No. 115—500,000 lbs., blue, buff, cherry, green, pink, salmon and yellow. No. 32; flat, cut any size, min. width 21 ins., max. width 34 ins.

Stanford Paper Co.	8.28c
Baxter Paper Co.	9.50c
Barton, Duer & Koch Paper Co.	9.15c
Aetna Paper Co.	8.243c

No. 116—400,000 lbs., blue, buff, cherry, green, pink, salmon and yellow No. 40; flat, cut any size min. width 21 ins., max. width 34 ins.

Stanford Paper Co.	7.88c
Baxter Paper Co.	8.90c
Barton, Duer & Koch Paper Co.	8.55c
Aetna Paper Co.	7.873c

No. 117—80,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 48; flat, cut any size, min. width 21 ins., max. width 34 ins.

Stanford Paper Co.	7.88c
Barton, Duer & Koch Paper Co.	8.55c
Aetna Paper Co.	7.973c

50 Per Cent Rag Bond, White and Colored

No. 120—100,000 lbs., white, No. 26; flat, cut any size, min. width 21 ins., max. width 34 ins.

R. P. Andrews Paper Co.	11.93c
Barton, Duer & Koch Paper Co.	11.85c
Aetna Paper Co.	11.313c

No. 121—700,000 lbs., white, Nos. 32 and 40; flat, cut any size, min. width 21 ins., max. width 34 ins.

R. P. Andrews Paper Co. 400,000 lbs.	9.17c
300,000 lbs.	9.63c
Graham Paper Co.	10.97c
Barton, Duer & Koch Paper Co.	9.35c
Aetna Paper Co. 200 tons	8.423c
Balance	8.883c

No. 122—200,000 lbs., white, No. 48; flat, cut any size, min. width 21 ins., max. width 34 ins.

R. P. Andrews Paper Co.	9.07c
Virginia Paper Co.	9.66c
Barton, Duer & Koch Paper Co.	9.35c
Aetna Paper Co. (50 tons)	8.423c
Balance	8.883c

No. 123—10,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, Nos. 32 and 40; flat, cut any size, min. width 21 ins., max. width 34 ins. Min. order, one color, one substance, 2,500 lbs.

Barton, Duer & Koch Paper Co.	11.75c
Aetna Paper Co.	10.983c

75 Per Cent Rag White Bond

No. 125—2,500 lbs., No. 26; flat, cut any size, min. width 21 ins., max. width 32 ins. Min. order, 2,500 lbs.

R. P. Andrews Paper Co.	19.79c
Stanford Paper Co.	20.00c

No. 126—2,500 lbs., Nos. 32, 40, and 48; flat, cut any size, min. width 21 ins., max. width 32 ins. Min. order, one substance, 2,500 lbs.

R. P. Andrews Paper Co.	20.18c
Stanford Paper Co.	17.40c
Barton, Duer & Koch Paper Co.	17.50c

100 Per Cent Rag White Bond

No. 128—6,000 lbs., Nos. 32 and 40; flat, cut any size, min. width 16 ins., max, width 32 ins. Min. order, one substance, 2,000 lbs.

R. P. Andrews Paper Co.	22.09c
Stanford Paper Co.	18.88c
Barton, Duer & Koch Paper Co.	19.30c

No. 129—5,000 lbs., No. 48; flat cut any size, min. width 16 ins., max. width 32 ins. Min. order, 2,000 lbs.

R. P. Andrews Paper Co.	22.09c
Stanford Paper Co.	18.88c
Barton, Duer & Koch Paper Co.	19.30c

100 Per Cent Rag Declaration Bond

No. 140—4,000 lbs., Nos. 32 and 40; flat, cut 17x22 and 22x25½ ins. Min. order, one substance, 3,000 lbs.

Stanford Paper Co.	22.68c

100 Per Cent Rag Parchment Deed

No. 141—2,000 lbs., No. 64; flat, cut 33x34 ins. Min. order, 2,000 lbs.

R. P. Andrews Paper Co.	23.03c
Stanford Paper Co.	19.25c
Barton, Duer & Koch Paper Co.	19.30c

Sulphite White Ledger

No. 151—200,000 lbs., Nos. 56 and 64; flat, cut any size, min. width 17 ins., max. width 32 ins. Min. order, one substance, 10,000 lbs.

R. P. Andrews Paper Co.	6.13c
Walker-Goulard-Plehn Co.	6.375c
Stanford Paper Co.	8.15c
Old Dominion Paper Co.	7.069c
Graham Paper Co.	6.15c
Barton, Duer & Koch Paper Co.	6.07c
Aetna Paper Co.	6.923c
Marquette Paper Co.	5.98c

No. 152—150,000 lbs., No. 80; flat, cut any size, min. width 17 ins., max. width 32 ins.

R. P. Andrews Paper Co.	6.37c
Walker-Goulard-Plehn Co.	6.375c
Stanford Paper Co.	8.15c
Old Dominion Paper Co.	7.069c
Graham Paper Co.	6.39c
Barton, Duer & Koch Paper Co.	6.30c
Aetna Paper Co.	6.923c
Marquette Paper Co.	5.98c

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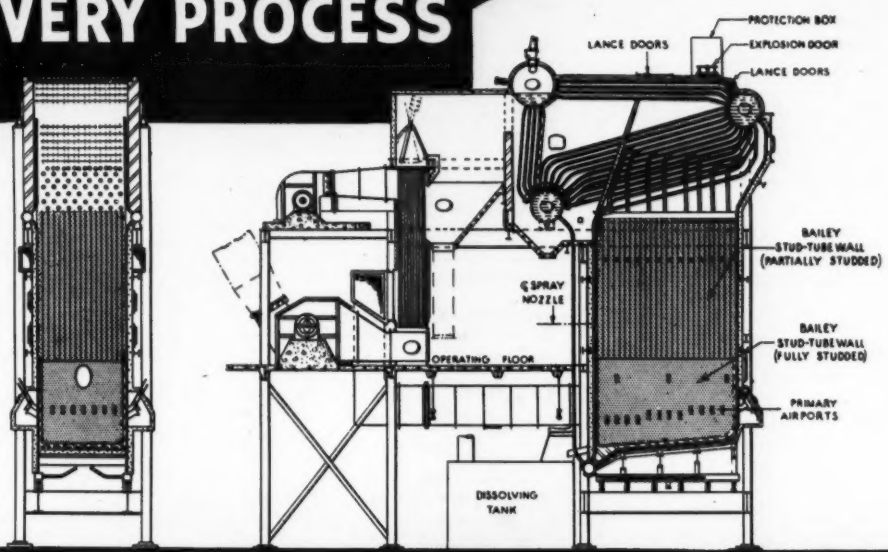
B&W-TOMLINSON RECOVERY PROCESS



for daily pulp capacities of 62½ to 100 tons

Forty-eight B&W-Tomlinson Units are now in successful operation in the United States. With this broad background of experience, the Company has introduced a new unit which is particularly suitable for modernization work in mills producing 62½ to 100 tons of pulp daily.

Small space requirements frequently enable installation with little or no change to existing buildings. The savings thereby effected, plus those realized from the operation of this modern process, insure adequate return on the investment.

Investigate the possibilities of such modernization in your mill.

HIGH CHEMICAL RECOVERY AND REDUCTION

MAXIMUM STEAM PRODUCTION

LOW MAINTENANCE COSTS

MINIMUM LABOR REQUIREMENTS

COMPLETELY ENCLOSED, GAS-TIGHT CONSTRUCTION

COORDINATED SEMI-AUTOMATIC CONTROL

The Babcock & Wilcox Company 85 Liberty St., New York, N. Y. BL-12

BABCOCK & WILCOX

25 Per Cent Rag Ledger, White and Colored

No. 154—100,000 lbs., white, Nos. 48 and 56; flat, cut 20x28, 21x32, 24x38, 28x29 and 28x34 ins. Min. order, one substance, 5,000 lbs.

Walker-Goulard-Plehn Co.	9.50c
Stanford Paper Co.	8.25c
Mudge Paper Co.	8.24c
Baxter Paper Co.	9.02c
Barton, Duer & Koch Paper Co.	8.55c
Aetna Paper Co.	7.973c
Mathers-Lamm Paper Co.	9.11c
Paper Corp. of U. S.	10.69c

No. 155—5,000 lbs., white, No. 64; flat, cut 21x32 and 23x36 ins. Min. order, 5,000 lbs.

Walker-Goulard-Plehn Co.	9.90c
Mudge Paper Co.	8.81c
Baxter Paper Co.	9.80c
Barton, Duer & Koch Paper Co.	8.75c
Aetna Paper Co.	8.673c
Mathers-Lamm Paper Co.	9.51c
Paper Corp. of U. S.	10.69c

No. 156—20,000 lbs., white, No. 72; flat, cut 20x28, 21x32, 24x38, and 28x34 ins. Min. order, 5,000 lbs.

Walker-Goulard-Plehn Co.	9.90c
Mudge Paper Co.	8.74c
Baxter Paper Co.	9.60c
Barton, Duer & Koch Paper Co.	8.75c
Aetna Paper Co.	8.673c
Mathers-Lamm Paper Co.	9.51c
Paper Corp. of U. S.	10.69c

No. 157—40,000 lbs., blue, buff, green, pink, salmon and yellow, Nos. 56, 64, and 72; flat, cut 21x32, 23x36, 24x38, 26x36, and 28x34 ins. Min. order, one substance, one color, 3,000 lbs.

Walker-Goulard-Plehn Co.	10.40c
Barton, Duer & Koch Paper Co.	9.55c
Aetna Paper Co.	9.483c
Mathers-Lamm Paper Co.	10.15c
Paper Corp. of U. S.	11.49c

50 Per Cent Rag Ledger, White and Colored

No. 160—80,000 lbs., white, Nos. 48 and 56; flat, cut 18½x36, 18½x40¼, 20x28, 21x32, 24x38, 28x29, and 28x34 ins. Min. order, one substance, 10,000 lbs.

R. P. Andrews Paper Co.	10.03c
Walker-Goulard-Plehn Co.	13.22c
Stanford Paper Co.	9.98c
Old Dominion Paper Co.	10.628c
Mudge Paper Co.	9.33c
Barton, Duer & Koch Paper Co.	9.85c
Aetna Paper Co.	9.633c
Paper Corp. of U. S.	11.69c

No. 161—20,000 lbs., white, No. 64; flat, cut 21x32 and 23x36 ins. Min. order, 10,000 lbs.

R. P. Andrews Paper Co.	10.53c
Walker-Goulard-Plehn Co.	13.22c
Old Dominion Paper Co.	10.628c
Mudge Paper Co.	9.33c
Barton, Duer & Koch Paper Co.	9.85c
Aetna Paper Co.	9.733c
Paper Corp. of U. S.	11.69c

No. 162—120,000 lbs., white, Nos. 72 and 80; flat, cut 20x28, 21x32, 24x38, 28x34 and 35½x46½ ins.; on size 35½x46½ the grain to run crosswise of the sheet. Min. order, 10,000 lbs.

R. P. Andrews Paper Co.	10.33c
Walker-Goulard-Plehn Co.	13.22c
Barton, Duer & Koch Paper Co.	9.85c
Aetna Paper Co.	9.483c
Paper Corp. of U. S.	11.69c

No. 163—50,000 lbs., white, No. 88; flat, cut 21x32½ ins. Min. order, 10,000 lbs.

R. P. Andrews Paper Co.	11.13c
Walker-Goulard-Plehn Co.	13.22c
Old Dominion Paper Co.	10.628c
Mudge Paper Co.	9.56c
Barton, Duer & Koch Paper Co.	9.85c
Aetna Paper Co.	9.733c
Paper Corp. of U. S.	11.69c

No. 164—100,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, Nos. 56, 64, and 72; flat cut 18½x36, 18½x40¼, 19x24, 21x32, 23x36, and 28x34 ins. Min. order, one substance, one color, 5,000 lbs.

Walker-Goulard-Plehn Co.	13.72c
Mudge Paper Co.	9.89c
Barton, Duer & Koch Paper Co.	10.15c
Aetna Paper Co.	10.133c
Paper Corp. of U. S.	12.00c

No. 165—20,000 lbs., blue, buff, cherry, fawn, green, pink, salmon and yellow. No. 88; flat, cut 21x32½ ins. Min. order, one color, 5,000 lbs.

Walker-Goulard-Plehn Co.	13.72c
Mudge Paper Co.	9.91c
Barton, Duer & Koch Paper Co.	10.15c
Aetna Paper Co.	10.133c
Paper Corp. of U. S.	12.35c

75 Per Cent Rag Ledger, White and Colored

No. 168—10,000 lbs., white, Nos. 48 and 56; flat, cut 21x32, 24x38, 28x29, and 28x34 ins. Min. order, one substance, 4,000 lbs.

Walker-Goulard-Plehn Co.	16.55c
Stanford Paper Co.	14.58c
Barton, Duer & Koch Paper Co.	13.63c
Aetna Paper Co.	13.933c
Paper Corp. of U. S.	14.47c

No. 169—10,000 lbs., white, No. 64; flat, cut 21x32, 23x36, 24x38, and 28x34 ins. Min. order, 5,000 lbs.

Walker-Goulard-Plehn Co.	16.55c
Stanford Paper Co.	14.58c
Barton, Duer & Koch Paper Co.	13.63c
Aetna Paper Co.	13.933c
Paper Corp. of U. S.	14.47c

No. 170—15,000 lbs., white, Nos. 72 and 80; flat, cut 20x28, 21x32, 24x38, and 28x34 ins. Min. order, one substance, 5,000 lbs.

Walker-Goulard-Plehn Co.	16.55c
Stanford Paper Co.	14.58c
Barton, Duer & Koch Paper Co.	13.63c
Aetna Paper Co.	13.933c
Paper Corp. of U. S.	14.47c

No. 171—8,000 lbs., white, No. 88; flat, cut 21x32½ ins. Min. order, 5,000 lbs.

Walker-Goulard-Plehn Co.	16.55c
Stanford Paper Co.	14.58c
Barton, Duer & Koch Paper Co.	13.63c
Aetna Paper Co.	13.933c
Paper Corp. of U. S.	14.47c

No. 172—12,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, Nos. 56, 64, and 72; flat, cut 21x32, 23x36, 24x38, and 28x34 ins. Min. order, one substance, one color, 3,000 lbs.

Walker-Goulard-Plehn Co.	16.90c
Stanford Paper Co.	15.44c
Barton, Duer & Koch Paper Co.	14.95c
Aetna Paper Co.	15.233c
Paper Corp. of U. S.	15.20c

No. 173—6,000 lbs., blue, buff, cherry, fawn, green, pink, salmon and yellow, No. 88; flat, cut 21x32½ ins. Min. order, one color, 4,000 lbs.

Walker-Goulard-Plehn Co.	16.90c
Stanford Paper Co.	15.44c
Barton, Duer & Koch Paper Co.	14.95c
Aetna Paper Co.	15.233c
Paper Corp. of U. S.	15.20c

100 Per Cent Rag White Ledger

No. 176—10,000 lbs., No. 48; flat, cut 21x32, 22¾x31½, 23x36, 24x38, and 28x34 ins. Min. order, 4,000 lbs.

R. P. Andrews Paper Co.	20.87c
Walker-Goulard-Plehn Co.	21.68c
Stanford Paper Co.	18.73c
Barton, Duer & Koch Paper Co.	17.63c
Paper Corp. of U. S.	20.93c

No. 177—15,000 lbs., No. 56; flat, cut 20x28, 21x32, 23x36, 24x38, and 28x34 ins. Min. order 5,000 lbs.

R. P. Andrews Paper Co.	20.87c
Walker-Goulard-Plehn Co.	21.68c
Stanford Paper Co.	18.73c
Barton, Duer & Koch Paper Co.	17.63c
Paper Corp. of U. S.	20.93c

No. 178—20,000 lbs., No. 64; flat, cut 18½x42, 21x32, 23x36, and 28x34 ins. Min. order, 5,000 lbs.

R. P. Andrews Paper Co.	20.87c
Walker-Goulard-Plehn Co.	21.68c
Stanford Paper Co.	18.63c
Barton, Duer & Koch Paper Co.	17.63c
Paper Corp. of U. S.	20.93c

No. 179—5,000 lbs., No. 72; flat, cut 20x28, 21x32, 24x38, and 28x34 ins. Min. order, 5,000 lbs.

R. P. Andrews Paper Co.	20.87c
Walker-Goulard Plehn Co.	21.68c
Stanford Paper Co.	18.93c
Barton, Duer & Koch Paper Co.	17.63c
Paper Corp. of U. S.	20.93c

No. 180—4,000 lbs., No. 80; flat, cut 21x32½ and 21x42 ins. Min. order, 4,000 lbs.

R. P. Andrews Paper Co.	20.87c
Walker-Goulard-Plehn Co.	21.68c
Stanford Paper Co.	18.93c
Barton, Duer & Koch Paper Co.	17.63c
Paper Corp. of U. S.	20.93c

No. 181—10,000 lbs., No. 88; flat, cut 20½x24¾, 21x32½ and 22¾x31½ ins. Min. order, 5,000 lbs.

R. P. Andrews Paper Co.	20.87c
Walker-Goulard-Plehn Co.	21.68c
Stanford Paper Co.	18.83c
Barton, Duer & Koch Paper Co.	17.63c
Paper Corp. of U. S.	20.93c

Sulphite White Index

No. 184—300,000 lbs., 22½x28½—182 and 230; flat, cut 21x32½, 22½x28½, 24½x32½ and 32½x48½ ins., with projecting colored-paper marker between each 100 sheets. Min. order, one weight, 10,000 lbs.

Perkins-Goodwin Co.	6.375c
R. P. Andrews Paper Co.	6.33c
Walker-Goulard-Plehn Co.	5.85c
Stanford Paper Co.	7.85c
Cauthorne Paper Co., Inc.	6.31c
Whitaker Paper Co.	5.58c
Virginia Paper Co.	6.28c
Graham Paper Co.	6.375c
Marquette Paper Co.	5.63c

50 Per Cent Rag Index, White and Colored

No. 190—500,000 lbs., white, 22½x28½—182 and 230; flat, cut 21x32½, 22½x28½ and 24½x32½ ins., with projecting colored-paper marker between each 100 sheets. Min. order, one weight, 10,000 lbs.

Walker-Goulard Plehn Co.	11.58c
Old Dominion Paper Co.	8.89c
Graham Paper Co.	9.90c
Barton, Duer & Koch Paper Co.	8.33c
Aetna Paper Co.	8.233c
Marquette Paper Co.	9.95c
Paper Corp. of U. S.	14.47c

No. 191—15,000 lbs., white, 22½x28½—280 and 362; flat, cut 21x32½ and 22½x28½ ins., with projecting colored-paper marker between each 100 sheets. Min. order, one weight, 5,000 lbs.

Walker-Goulard-Plehn Co.	12.73c
Graham Paper Co.	13.80c
Barton, Duer & Koch Paper Co.	11.35c
Marquette Paper Co.	13.90c

No. 192—300,000 lbs., blue, buff, fawn, green, pink, salmon and yellow, 22½x28½—182 and 230; flat, cut 21x32½ and 22½x28½ ins., with projecting colored-paper marker between each 100 sheets. Min. order, one color, one weight, 5,000 lbs.

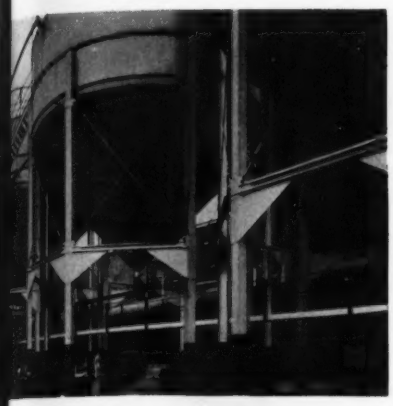
Walker-Goulard-Plehn Co.	11.78c
Old Dominion Paper Co.	9.14c
Graham Paper Co.	10.30c
Barton, Duer & Koch Paper Co.	8.34c
Aetna Paper Co.	8.233c
Marquette Paper Co.	10.25c
Mathers-Lamm Paper Co.	11.64c
Paper Corp. of U. S.	14.97c

No. 193—30,000 lbs., blue, buff, fawn, green, pink, salmon and yellow, 22½x28½—280 and 362; flat, cut 21x32½ and 22½x28½ ins., with projecting colored-paper marker between each 100

MERRITT-CHAPMAN & SCOTT CORPORATION

the General Contractors for the construction of the pulp and paper board mill at Jacksonville, Florida, for National Container Corporation performed all of the work from foundations to installation of producing machinery.

WE HAVE BUILT five pulp and paper mills in the last four years.

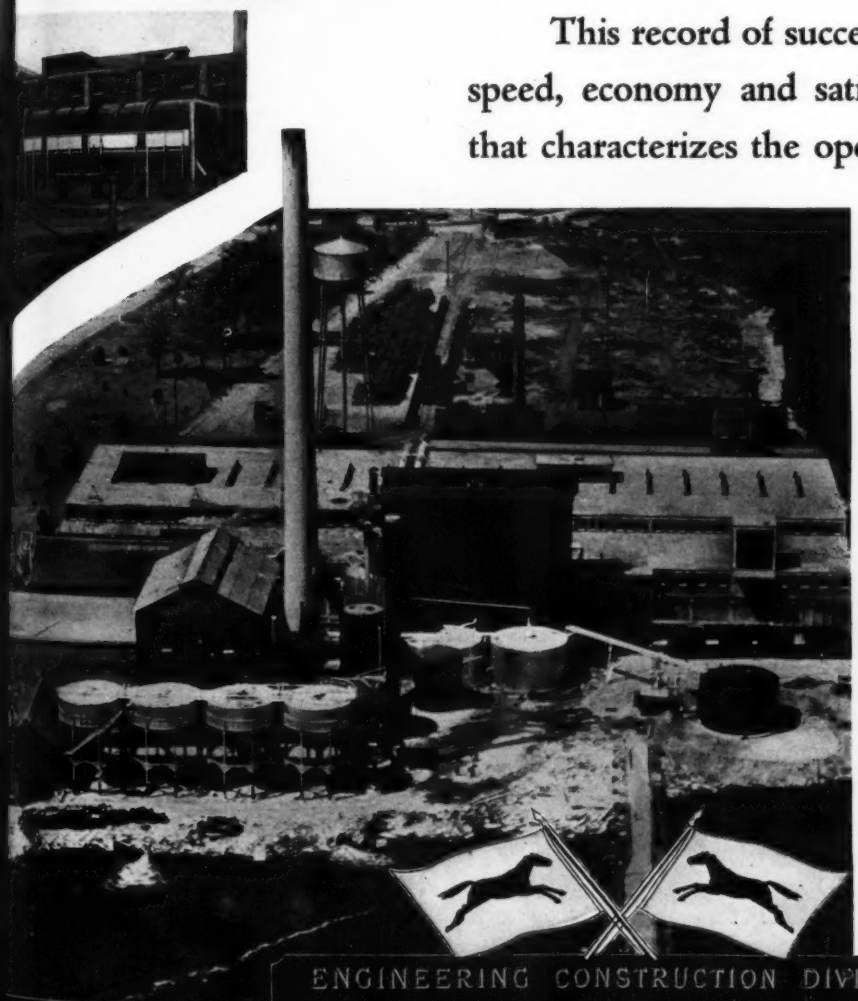


WE ARE NOW BUILDING

The Newsprint Mill for Southland Paper Mills, Inc. at Lufkin, Texas.

The High Grade Coated Paper Mill for Champion Paper & Fibre Company near Houston, Texas.

This record of successive contracts evidences the speed, economy and satisfactory owner relationship that characterizes the operations of this company.



Views of National Container Corporation Mill, Jacksonville, Fla.

Johnson & Wierk, Inc., Consulting Engineers

ENGINEERING CONSTRUCTION DIVISION

MERRITT-CHAPMAN & SCOTT CORPORATION

17 BATTERY PLACE FOUNDED 1860 NEW YORK, N.Y.

sheets. Min. order, one color, one weight, 5,000 lbs.

Walker-Goulard-Plehn Co.	13.10c
Graham Paper Co.	14.70c
Barton, Duer & Koch Paper Co.	11.35c
Marquette Paper Co.	14.80c

100 Per Cent Rag White Index

No. 196—90,000 lbs., 22½x28½—approximately 206; flat, cut 20½x30½ and 21x32½ ins.

R. P. Andrews Paper Co.	18.08c
Walker-Goulard-Plehn Co.	20.43c
Mudge Paper Co.	16.57c
Barton, Duer & Koch Paper Co.	16.62c
Marquette Paper Co.	16.95c
Lee Paper Co.	24.16c
Mathers-Lamm Paper Co.	18.13c
Paper Corp. of U. S.	19.49c

White Tissue

No. 197—3,000 lbs., flat, 21x32—18. Min. order 1,000 lbs.

R. P. Andrews Paper Co.	13.13c
Mathers-Lamm Paper Co.	11.55c

Facing Stereo Tissue

No. 198—500 lbs., 19x24—9; rolls 24 in. wide (3-inch fiber cores). Min. order, 500 lbs.

No bids.

Coated Cover, White and Colored

No. 201—60,000 lbs., white, 20x26—130 and 160; flat, 26½x41 ins., the grain to run lengthwise of the sheet. Min. order, 5,000 lbs.

Stanford Paper Co.	7.53c
Whitaker Paper Co.	7.18c
Virginia Paper Co.	7.32c
Graham Paper Co.	7.40c
Barton, Duer & Koch Paper Co.	7.33c

No. 202—30,000 lbs., India tint, light green, and emerald green, 20x26—100; flat, 26½x41 ins. Min. order, 5,000 lbs.

Whitaker Paper Co.	7.58c[1] 8.18c[2] 8.68c[3]
Virginia Paper Co.	7.82c
Graham Paper Co.	7.90c
Barton, Duer & Koch Paper Co.	7.82c

[1] India [2] Light Green [3] Emerald.

Machine-Finish Cover, White and Colored

No. 203—150,000 lbs., antique; white, dawn, quaker drab, robin's egg, terra cotta, light blue, dark blue, buff, gold, cream, light gray, dark gray, light brown, dark brown, light green, dark green, sage, gobelin blue, and coral red; flat, 20x25—96, with projecting colored-paper marker between each 500 sheets. Min. order, one color 5,000 lbs.

R. P. Andrews Paper Co.	7.43c
Stanford Paper Co.	7.73c
Whitaker Paper Co.	9.11c
Marquette Paper Co.	6.88c

No. 204—40,000 lbs., smooth; white, blue, brown, granite, green, pink, tea and yellow, 20x26—100; flat cut 20x25 and 33x46 ins., with projecting colored-paper marker between each 500 sheets. Min. order, one color, 5,000 lbs.

R. P. Andrews Paper Co.	7.43c
Stanford Paper Co.	7.73c
Whitaker Paper Co.	9.11c
Marquette Paper Co.	6.88c

50 Per Cent Rag Laid Cover, Colored

No. 205—20,000 lbs., blue, cream, white, gray and green, 20x26—130; flat, cut 20x25, 22x33, 26½x41, and 28x41 ins., with projecting colored-paper marker between each 500 sheets. Min. order, one color, 2,000 lbs.

R. P. Andrews Paper Co.	10.43c
Walker-Goulard-Plehn Co.	13.88c
Graham Paper Co.	11.08c
Lee Paper Co.	9.99c

Wood Manila

No. 209—300,000 lbs., 24x36—80 to 120; flat, cut 21x32, 22½x34½, 25x38 and 32x36 ins., in wrapped bundles with projecting colored-paper marker between each 500 sheets.

Cauthorne Paper Co., Inc.	4.23c
Old Dominion Paper Co.	4.184c
Paper Corp. of U. S.	4.20c

No. 210—200,000 lbs., 24x36—80 to 120; rolls, 18 and 21 ins. wide (3-inch fiber cores).

Cauthorne Paper Co., Inc.	3.98c
Old Dominion Paper Co.	3.933c
Paper Corp. of U. S.	3.80c

Chemical Wood Manila

No. 211—40,000 lbs., 24x36—100 to 160; flat, cut any size in wrapped bundles. Min. order, one weight, 5,000 lbs.

No bids.

Rope Manila

No. 213—10,000 lbs., 24x36—120, 140 and 160; rolls, 18 and 48 ins. wide (3-inch fiber cores). Min. order, 5,000 lbs.

R. P. Andrews Paper Co.	15.90c

No. 214—20,000 lbs., 24x36—280; rolls, 48 ins. wide (3-inch fiber cores). Min. order, 5,000 lbs.

R. P. Andrews Paper Co.	14.90c

Drumhead Manila

No. 215—30,000 lbs., 24x36—280; flat, cut 20x30 and 26x42 ins. Min. order, 5,000 lbs.

Mudge Paper Co.	15.60c

No. 2 Kraft

No. 217—200,000 lbs., 24x36—80 to 160; flat, cut any size in wrapped bundles.

R. P. Andrews Paper Co.	4.16c
Cauthorne Paper Co., Inc.	4.82c
Mudge Paper Co.	4.81c
Mathers-Lamm Paper Co.	4.33c

No. 218—200,000 lbs., 24x36—80 to 160; cut any size, folded (25 sheets per fold), in wrapped bundles.

R. P. Andrews Paper Co.	4.16c
Cauthorne Paper Co., Inc.	4.82c
Mudge Paper Co.	4.81c
Mathers-Lamm Paper Co.	4.33c

No. 219—350,000 lbs., 24x36—80 to 160; rolls, 9, 10½, 11½, 24, 36, 39, and 48 ins. wide, wound on wooden plugs, 1½-inch hole, or on 3-inch fiber cores as may be specified.

R. P. Andrews Paper Co.	3.92c
Cauthorne Paper Co., Inc.	4.58c
Mudge Paper Co.	4.57c
Mathers-Lamm Paper Co.	4.08c

No. 1 Kraft

No. 220—5,000 lbs., 24x36—120 and 160; flat, cut any size in wrapped bundles.

Mathers-Lamm Paper Co.	6.00c 4.625c

White Paraffin

No. 251—1,500 lbs. flat, 24x38—32. Min. order, 1,000 lbs.

No bids.

White Gummed

No. 252—400,000 sheets, flat, 17x22—40, exclusive of weight of gum used. Min. order, 50,000 sheets.

	Per M sheets
Andrews Paper House of York	6.20c
Stanford Paper Co.	5.99c
Cauthorne Paper Co., Inc.	6.176c
Old Dominion Paper Co.	6.259c
Mudge Paper Co.	5.47c
Virginia Paper Co.	6.20c
Graham Paper Co.	6.10c
Barton, Duer & Koch Paper Co.	5.80c

Blotting, White and Colored

No. 254—10,000 lbs., white, flat, 19x24—160, in wrapped bundles. Min. order, 4,000 lbs.

L. Hyman & Sons	5.53c
R. P. Andrews Paper Co.	5.67c
Stanford Paper Co.	5.43c
Butler Co.	5.48c
Whitaker Paper Co.	5.42c
Virginia Paper Co.	5.48c

No. 255—2,000 lbs., buff and salmon, flat, 19x24—160, in wrapped bundles. Min. order, 2,000 lbs.

L. Hyman & Sons	6.38c
R. P. Andrews Paper Co.	6.23c
Stanford Paper Co.	6.26c
Butler Co.	**6.32c**
Whitaker Paper Co.	5.87c
Graham Paper Co.	6.32c

25 Per Cent Rag Blotting, White and Colored

No. 256—20,000 lbs., white, flat, 19x24—160, in wrapped bundles. Min. order, 10,000 lbs.

L. Hyman & Sons	6.49c
R. P. Andrews Paper Co.	6.53c
Stanford Paper Co.	6.38c
Butler Co.	6.44c
Whitaker Paper Co.	6.37c
Graham Paper Co.	6.44c

No. 257—10,000 lbs., buff and salmon, flat, 19x24—160, in wrapped bundles. Min. order, one color, 2,000 lbs.

L. Hyman & Sons	7.18c
R. P. Andrews Paper Co.	7.43c
Stanford Paper Co.	7.04c
Butler Co.	7.11c
Whitaker Paper Co.	6.94c
Graham Paper Co.	7.11c

Desk Blotting, Colored

No. 258—10,000 lbs., blue and buff, flat, 19x24—200, in wrapped bundles. Min. order, one color, 5,000 lbs.

L. Hyman & Sons	(Buff)	5.86c
	(Blue)	5.79c
R. P. Andrews Paper Co.		5.43c
Stanford Paper Co.	(Buff)	5.76c
	(Blue)	5.69c
Butler Co.	(Buff)	5.81c
	(Blue)	5.74c
Whitaker Paper Co.		5.49c
Graham Paper Co.	(Buff)	5.81c
	(Blue)	5.74c

No. 259—100,000 lbs., moss-green, flat, 19x24—200, in wrapped bundles. Min. order, 10,000 lbs.

L. Hyman & Sons	5.92c
R. P. Andrews Paper Co.	4.73c
Stanford Paper Co.	5.87c
Butler Co.	5.92c
Whitaker Paper Co.	5.63c
Graham Paper Co.	5.92c

White Stereotype Molding

No. 260—1,500 lbs., 19x24—120; rolls, 24 ins. wide (3-inch fiber cores). Min. order, 1,000 lbs.

L. Hyman & Sons	8.68c
Stanford Paper Co.	8.52c
Cauthorne Paper Co., Inc.	8.96c
Butler Co.	8.60c
Graham Paper Co.	8.60c

Red Stereotype Molding

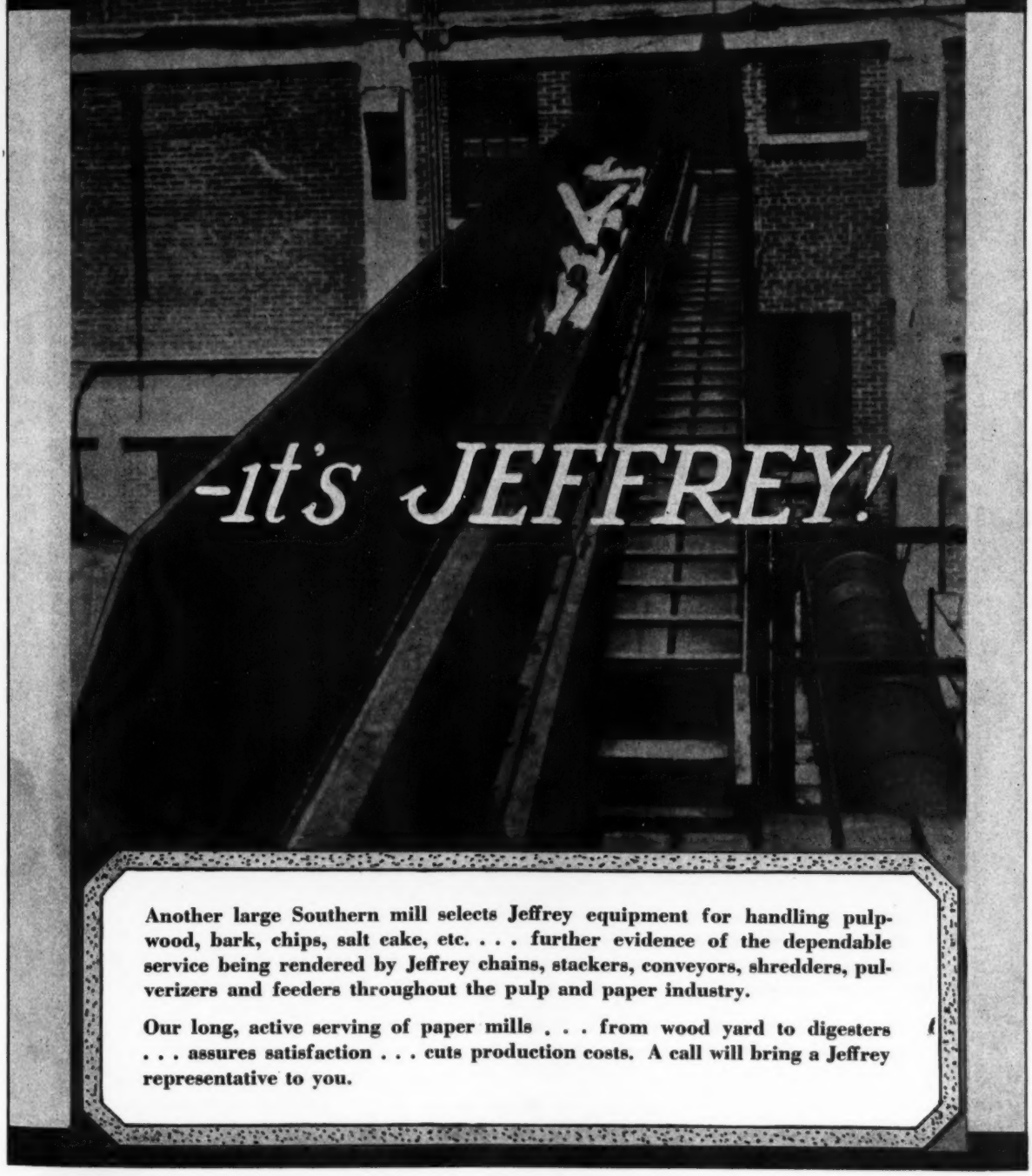
No. 261—1,000 lbs., 19x24—40; rolls, 24 in. wide (3-inch fiber cores). Min. order, 1,000 lbs.

L. Hyman & Sons	10.35c
Stanford Paper Co.	10.15c
Cauthorne Paper Co.	13.90c
Butler Co.	10.25c
Graham Paper Co.	10.25c

Oiled Manila Tympan

No. 262—30,000 lbs., 24x36—approxi-

at National Container Corp.-



-it's JEFFREY!

Another large Southern mill selects Jeffrey equipment for handling pulpwood, bark, chips, salt cake, etc. . . . further evidence of the dependable service being rendered by Jeffrey chains, stackers, conveyors, shredders, pulverizers and feeders throughout the pulp and paper industry.

Our long, active serving of paper mills . . . from wood yard to digesters . . . assures satisfaction . . . cuts production costs. A call will bring a Jeffrey representative to you.

THE JEFFREY MANUFACTURING COMPANY
931-99 N. 4th St. Columbus, Ohio

mately 210; rolls, 38 and 48 ins. wide; 10-inch diameter; wound on wooden plugs, 1½-inch hole. Min. order, 5,000 lbs.

Link Paper Co.	8.50c
Cromwell Paper Co.	8.00c
Mudge Paper Co.	7.70c
Mathers-Lamm Paper Co.	8.52c

Plate-Wiping, for Embossing Presses

No. 263—3,000 lbs., 24x36—100; rolls, 24 ins. wide (3-inch fiber cores). Min. order, 1,000 lbs.

No bids.

Back-Lining for Case-Making Machines

No. 264—3,000 lbs., 24x36—180; rolls, 24 ins. diameter, 37 ins. wide (3-inch fiber cores). Min. order, 2,000 lbs.

Barton, Duer & Koch Paper Co.	4.25c

High-Finish Red Sulphite

No. 265—7,000 lbs., flat, 24x36—320 and 400, in wrapped bundles. Min. order, 5,000 lbs.

Whitaker Paper Co.	7.75c
Mudge Paper Co.	7.15c

High-Finish Sulphite Manila Tag

No. 271—80,000 lbs., 24x36—160 to 280; flat, cut any size, min. width 24 ins., max. width 38 ins., in wrapped bundles.

R. P. Andrews Paper Co.	5.95c
Papers Corp. of U. S.	5.48c

Calendered Tag, Manila and Colored

No. 276—1,000,000 lbs., manila, 22½x28½—approximately 148; rolls, 23¼ and 26½ ins. wide (6-inch iron cores).

Fitchburg Paper Co.	6.72c
Barton, Duer & Koch Paper Co.	7.60c

No. 277—250,000 lbs., blue, brown, green, pink, red, salmon and yellow, 22½x28½—approximately 148; rolls 23¼ and 26½ ins. wide (6-inch iron cores). Min. order, one color, 10,000 lbs.

Fitchburg Paper Co.	7.72c
Barton, Duer & Koch Paper Co.	8.60c

Jute Tag

No. 280—80,000 lbs., 22½x28½—200 and 280; flat cut 22½x28½ ins., in wrapped bundles. Min. order, one weight, 10,000 lbs.

Whitaker Paper Co.	8.77c
Mudge Paper Co.	8.20c

Manila Board

No. 281—30,000 lbs., 22½x28½—400; flat, cut 17x28, 21x32, and 22½x28½ ins., in wrapped bundles with projecting colored-paper marker between each 100 sheets. Min. order, 10,000 lbs.

R. P. Andrews Paper Co.	5.12c

Railroad Board, White and Colored

No. 302—80,000 sheets, white, flat, 22x28 ins., 4-ply, each 100 sheets fully banded, packed in wooden cases. Min. order, 10,000 sheets.

	Per M sheets
R. P. Andrews Paper Co.	22.83c
Stanford Paper Co.	22.25c
Whitaker Paper Co.	22.26c
Barton, Duer & Koch Paper Co.	22.20c
Paper Corp. of U. S.	21.00c

No. 303—15,000 sheets, white, flat, 22x28 ins., 8-ply, each 100 sheets fully banded, packed in wooden cases. Min. order, 5,000 sheets.

	Per M sheets
R. P. Andrews Paper Co.	36.30c
Stanford Paper Co.	35.35c
Whitaker Paper Co.	35.40c
Barton, Duer & Koch Paper Co.	35.40c
Paper Corp. of U. S.	31.85c

No. 304—30,000 sheets, white, flat, 22x28 ins., 14-ply, each 50 sheets fully banded, packed in wooden cases. Min. order, 5,000 sheet.

	Per M sheets
R. P. Andrews Paper Co.	46.53c
Stanford Paper Co.	45.35c
Whitaker Paper Co.	45.40c
Barton, Duer & Koch Paper Co.	45.35c
Paper Corp. of U. S.	44.00c

No. 305—50,000 sheets, ash gray, blue, buff, green, lemon and orange, flat 22x28 ins., 4-ply, each 100 sheets fully banded, packed in wooden cases. Min. order, one color, 5,000 sheets.

	Per M sheets
Stanford Paper Co.	29.00c
Whitaker Paper Co.	29.02c
Barton, Duer & Koch Paper Co.	29.05c
Paper Corp. of U. S.	28.00c

Wood Bristol, Colored

No. 306—200,000 lbs., buff, 22½x28½—150; rolls, 22 ins. wide (6-inch iron cores).

Old Dominion Paper Co.	4.174c
Barton, Duer & Koch Paper Co.	4.65c

No. 307—50,000 lbs., blue, buff, gray, green, melon, pink, quaker-drab and yellow, flat, 21x31—204; in wrapped bundles with projecting colored-paper marker between each 100 sheets.

Barton, Duer & Koch Paper Co.	4.90c

No. 308—50,000 lbs., blue, brown, buff, gray, green, melon, pink and yellow, 22½x28½—200; rolls, 20 ins. wide (6-inch iron cores).

Old Dominion Paper Co.	4.444c
Barton, Duer & Koch Paper Co.	4.65c

No. 309—50,000 lbs., blue, brown, buff, gray, green, melon, pink and yellow, 22½x28½—200; rolls, 26 ins. wide (6-inch iron cores).

Old Dominion Paper Co.	4.444c
Barton, Duer & Koch Paper Co.	4.65c

No. 310—60,000 lbs., buff, 22½x28½—200; flat, cut 12x18 and 14½x17½ ins., the grain to run lengthwise of the sheet, in wrapped bundles with projecting colored-paper marker between each 100 sheets.

Old Dominion Paper Co.	4.44c
Mudge Paper Co.	4.69c
Barton, Duer & Koch Paper Co.	4.90c

United States Postal Card Bristol

No. 325—6,000,000 lbs., 22½x28½—188; rolls, 33 ins. wide and 36 ins. in diameter (6-inch iron cores).

Whitaker Paper Co.	4.315c
Barton, Duer & Koch Paper Co.	4.245c
R. P. Andrews Paper Co.	4.305c

Pressboard, Colored

No. 351—25,000 sheets, red, flat, 24x32 ins., thickness .0140 inch. Min. order, 5,000 sheets.

	Per 100 sheets
Case Bros., Inc.	$6.34
Resolute Paper Products Corp.	$6.76
Walker-Goulard-Plehn Co.	$6.63
Whitaker Paper Co.	$6.15
Barton, Duer & Koch Paper Co.	$6.32

No. 352—10,000 sheets, gray, flat, 30x36 ins., thickness .0300 inch. Min. order, 5,000 sheets.

	Per 100 sheets
Case Bros., Inc.	$19.38
Resolute Paper Products Corp.	$21.46
Andrews Paper House of York	$18.39 $21.00
Walker-Goulard-Plehn Co.	$21.05
Whitaker Paper Co.	$19.56
Barton, Duer & Koch Paper Co.	$18.10

News Board

No. 360—5,000 lbs., flat, 26x38 ins., No. 100 (to be trimmed square on four sides). Min. order, 1,000 lbs.

L. Hyman & Sons	2.50c[1]
R. P. Andrews Paper Co.	2.30c
Stanford Paper Co.	2.375c
Old Dominion Paper Co.	2.373c
Whitaker Paper Co.	2.35c
Mudge Paper Co.	2.344c
Virginia Paper Co.	2.375c
Barton, Duer & Koch Paper Co.	2.28c

[1](Jan. and Feb. price only.)

Chip Board

No. 361—1,000,000 lbs., 26x38 ins., No. 50, flat; cut 21½x32½, 24½x38, 26x38, 28½x34½, 32½x42½ and 34x44.

L. Hyman & Sons	2.25c[1]
Resolute Paper Products Corp.	2.10c
R. P. Andrews Paper Co.	2.05c
Walker-Goulard-Plehn Co.	2.2423c
Stanford Paper Co.	2.119c
Cauthorne Paper Co., Inc.	2.21c
Old Dominion Paper Co.	2.0499c
Whitaker Paper Co.	2.10c
Mudge Paper Co.	2.028c
Virginia Paper Co.	2.039c
Barton, Duer & Koch Paper Co.	2.01c

[1](Jan. and Feb. price only.)

Marble Grained Lined Board

No. 362—15,000 lbs., 26x38 ins., No. 50; flat, cut 22x32 ins.

Mathers-Lamm Paper Co.	6.00c

Strawboard

No. 363—5,000 lbs., flat, 26x38 ins., No. 50.

Mathers-Lamm Paper Co.	5.28c

Lined Chip Board

No. 364—5,000 lbs., flat, 26x38 ins., No. 50.

R. P. Andrews Paper Co.	2.66c
Stanford Paper Co.	2.75c
Old Dominion Paper Co.	2.749c
Whitaker Paper Co.	2.72c
Mudge Paper Co.	2.712c
Virginia Paper Co.	2.75c
Barton, Duer & Koch Paper Co.	2.63c

Lined Box Board

No. 365—36,000 lbs., 26x38 ins., No. 40; flat, cut 24½x34 ins. Min. order 36,000 lbs.

L. Hyman & Sons	2.75c[1]
Reselute Paper Products Corp.	2.72c
R. P. Anrews Paper Co.	2.66c
Walker-Goulard-Plehn Co.	2.6175c
Stanford Paper Co.	2.74c
Old Dominion Paper Co.	2.719c
Whitaker Paper Co.	2.72c
Mudge Paper Co.	2.636c
Virginia Paper Co.	2.75c

[1](Jan. and Feb. price only.)

Binder's Board, No. 1 Quality

No. 366—230,000 lbs., flat, to trim 25x30 ins., Nos. 16, 18, 20, 25, 30 and 40.

Resolute Paper Products Corp.	3.90c
R. P. Andrews Paper Co.	3.75c
Graham Paper Co.	3.90c
Mathers-Lamm Paper Co.	3.66c

No. 367—80,000 lbs., 25¾x30¼ ins., Nos. 12 and 20; flat, to trim 34x44 ins.

Resolute Paper Products Corp.	3.90c
R. P. Andrews Paper Co.	3.75c
Graham Paper Co.	3.90c
Mathers-Lamm Paper Co.	3.66c

Binder's Board, Best Quality

No. 368—70,000 lbs., flat, to trim 20x30 ins., and 22x28 ins., Nos. 18, 20, 25, 30, 35, 40 and 45. Min. order, 5,000 lbs.

Resolute Paper Products Corp.	(carload)	5.20c 6.00c
R. P. Andrews Paper Co.	(carload)	5.30c
Graham Paper Co.	(carload)	5.20c 6.00c

D. F. Munroe Observe Anniversary

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., November 27, 1939—The D. F. Munroe Company, paper and twine merchants, who established their business in a small way 45 years ago, are observing their anniversary at 289 Congress street. From the first day, a reputation for quality products, satisfactory values, service and high standards of efficiency was incorporated. Today these basic principles are still the solid foundation of the business, as attested by the thousands of their satisfied customers, with the result that the D. F. Munroe Company has grown to be one of the largest distributors of paper, paper products and allied lines in the New England States. The officials and entire personnel of the company express to their customers a sincere appreciation of their valued patronage that made possible the success and growth of the firm. Serving a wide territory, they carry large stocks on hand at all times, their lines consisting of nationally known products, everyone of which is guaranteed by the D. F. Munroe Company.

Among the concerns the company represents are Milwaukee Lace Paper Company, The Linen Thread Company, Plymouth Cordage Company, Sanitary Products Corporation of America, Simon Box Company, Cel-U-Seal Corp., White-Washburne Company, Southern Advance Bag and Paper Corporation, Mid-States Gummed Paper Company, Russell Box Company, Chicago Printed String Company, Groveton Paper Mill Company, Hudson Pulp and Paper Corporation, Hammersley Paper Company, Inc., American Paper Goods Company, Ludlow Manufacturing and Sales Company, and Regal Paper Company.

The American Colorist

The Crimson Press, Westport, Connecticut, has recently issued a booklet by Faber Birren, entitled "The American Colorist"—A Practical Guide to Color Harmony and Color Identification. The purpose of the booklet is to establish a new and simplified system of color standardization for use by anyone concerned with color. The American Color Packet, a set of companion charts for the American Colorist is also available. Each may be obtained from the Crimson Press for one dollar.

George Bohan Is Guest Speaker

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., November 27, 1939—George Bohan, of the Stevens & Thompson Paper Company, North Hoosick and Greenwich, N. Y., was guest speaker at a sales meeting of Carter Rice & Co., Corporation at 8 o'clock Saturday morning. Mr. Bohan discussed Carico Toilet for about half an hour. Frank H. Winter, sales manager of the Carter Rice organization, presided.

Smith, Dee & Lane Get New Line

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., November 27, 1939—Smith, Dee & Lane, the well known mill representatives, have taken on the Eagle Cup Corporation's line of drinking cups, souffles, and standard and transparent straws. Mr. Smith (Smittie as he is called in the trade) plans to carry a large stock in his Boston warehouse so as to serve his many customers in the paper trade promptly.

New Literature

Acidseal paints, derived from rubber by a process developed and patented by the B. F. Goodrich Company, Akron, O., is the subject of a four-page catalogue section just issued by the company. It is interesting to the paper industry because of the unusual properties these paints have in affording protection for paper mill interiors against fumes and humidity.

Modern maintenance methods is the title of a booklet issued by the Porter-Cable Machine Company, Syracuse, N. Y. The booklet describes the utility of the Tri-craft Floorworker, Speedmatic saw, Taleabout sanders and Speedmatic floormachines. Information is given on the maintenance of floors of wood, marble, linoleum and other materials. Sanding and refinishing and cleaning, polishing, paint removal and refinishing operations are described. The wide utility of the Speedmatic saw, which can be taken to the job and used for every cutting operation should be of special interest to maintenance departments.

Automatic tension control of leather belt drives, is the subject of a comprehensive booklet issued by The American Pulley Company, 4200 Wissahicken avenue, Philadelphia, Pa. The advantages of short center, pivoted, motor leather belt drives for electric motors and internal combustion engines, with full data is clearly presented in a convenient form. Comparative first costs, standard pulleydiameters and motor belt speeds, horse power tables, drive selection data and list prices are given. Installation of drive installations in many paper mills are included.

Industrial thermometers are described in a 24-page catalogue, No. 112C just issued by the C. J. Tagliabue Manufacturing Company, Park & Nostrand avenues, Brooklyn, N. Y. The complete line of TAG industrial thermometers are listed, together with a representative line of TAG miscellaneous thermometers, hygrometers, 7-gauges, mercurial vacuum gauges and mercurial barometers.

Laboratory analysis, consultation and research, is described in a bulletin issued by The Orthmann Laboratories, Inc. 647 West Virginia street, Milwaukee, Wis. The service to the paper industry includes a specialized service in wood pulp weighing, sampling and testing. Complete facilities are available to make tests on wood pulp according to official methods.

Paper on parade, issued by the Howard Smith paper Mills, Limited, 407 McGill street, Montreal, Canada, contains a varied selection of the company's cover, text, bond, offset and blotting papers.

Bronze, iron and steel valves are described in a new catalogue, No. 78, just issued by The Lunkenheimer Company, Cincinnati, O. The company's complete line of valves, bouler mountings, lubricating devices, oil and grease cups, whistles, cocks, fittings, etc. are listed.

Model Series "T" precision lathes are described in catalogue No. 100 just issued by the South Bend Lathe Works, 425 East Madison street, South Bend, Ind. It is pointed out that the Series "T" is the most modern and practical South Bend lathe ever produced and each size is a precision tool capable of the most accurate machine work. Full information is given on the various sizes of lathes, types of drives are described, with the inclusion of tool, attachments and accessories.

Johns-Manville Products Corporation

Jarratt, Virginia

Many new and important developments for the insulating board industry have been employed in the recently completed Johns-Manville plant located at Jarratt, Va. Utilizing Southern pine, this modern efficient plant produces a greatly improved and broadened line of products which now come in a wide variety of color and design—as well as offering a novel "lightning" joint permitting completely invisible nailing.

Capable of manufacturing 100,000,000 square feet of insulating board products annually, this new plant employs a continuous production line starting at the wood storage area and carrying right through to the finishing and storage building, where the finished products are inspected, packaged and warehoused.

Adequate Source of Raw Material

The increasing cost and difficulty in obtaining a satisfactory supply of pulpwood for production facilities formerly maintained at Oswego, N. Y., caused Johns-Manville to conduct a most careful search for an adequate source of material. Experiments made in a laboratory controlled test plant resulted in the development of a far superior insulating board made of southern pine.

An exhaustive study of the supplies of Southern pine, as well as all the other factors involved in economical plant operation convinced the company that Jarratt offered unusual advantages. Extensive stands of pine in the immediate vicinity of the new plant site provide a perpetual supply of suitable wood fiber. Moreover Jarratt is located on a main line railway, with adequate local labor, ample room for expansion, and has the Nottoway river, only 2½ miles distant, available for process water.

Buy Thousands of Acres of Timberland

Thousands of acres of timberland have been purchased by the company and will be used on a sustained yield basis. Safeguarded by a complete forestry program, including fire protection and reforestation under the direction of an expert forester, this vast supply of raw materials will be supplemented by purchases of pulp wood from farmers in the area.

The ready accessibility of raw material plus the fact that logging can be carried on the year round makes it necessary to carry only a small supply of cut logs in the plant yard. The real inventory is maintained in standing timber within a radius of ten miles of the plant. As a result, the wood will always be live, clean, and uniform in its physical characteristics, providing a board of uniformly high quality.

Buildings and Equipment

The new plant includes a pulp preparation building, a drier building and a finishing and storage building all erected on concrete spread footings resting on compact sand and clay. All the walls are concrete to floor height and brick to the sills, then J-M Corrugated Transite and steel sash above.

Several unusual features of construction design materially reduced structural costs. Shop assembly and shop welding of the steel roof trusses saved approximately five per cent on the total of structural steel required. This saving, approximately seventy

IMPROVED MILL EQUIPMENT

BLEACHING EQUIPMENT

For single and multi-stage plants, large or small tonnage, for grades from semi-bleached to highest white on soda, sulphite, northern and southern kraft.

VACUUM FILTERS

All metal mould construction for rigidity—all metal drainage sections for permanently accurate diameter mould—smooth free drainage for cleanliness of moulds. Water passages accessible—smooth surface—streamline flow—proper velocity—no accumulation nor sliming. Smooth spirally wound support for filter face—maximum drainage—no undercover. Positive alignment conical valve for sharper cut-off and maximum filtration cycle. Integral enclosed drives—anti-friction bearings—low power and maintenance costs. "IMPCO" positive clearance pulp discharger. Complete sheet removal without abrasion or mechanical wear on face—simplicity facilitates washups. Washers and Thickeners can be furnished completely rubber covered for handling of acid and chlorinated stocks.

PNEUMATIC MACHINES

Used as Deckers, Thickeners, Save-alls and Water Filters. Low initial cost—satisfactory efficiency. Stock is removed from wire face without wear or abrasion by an air blast from the inside of the mould, maintaining at all times a clean wire.

KNOTTERS

Used universally on groundwood, sulphate, soda and sulphite, eliminate the coarse material, knots and shives, at the beginning of the screening process. Cleaner pulp, greater capacity, and lower power result at the fine screens.

The "Impco" Knotter, furnished all iron, bronze fitted, or rubber lined, handles 30 to 125 tons depending on the stock and perforation of plates used.

CENTRIFUGAL PULP SCREENS

Include double stream lined inlets, insuring uniform distribution of the stock to the impellers, which in turn distribute the stock evenly over the entire screen plate area. The leading center, double vane type impeller, exclusive with "Impco" assures quick elimination of tailings. A device for cleaning and inspecting the plates is provided by rotating the entire plate assembly. Used universally on groundwood, kraft, sulphite and soda pulps. Capacity 20 to 100 tons depending on type of stock and perforation of plates.

MULTIPLE STAGE WASHERS

For both Bleached and Secondary Stocks. The washing process is a series of dilutions with subsequent extractions of the residues in solution or suspension. After each dilution the fibres are separated, and thoroughly scrubbed. Each washer consists of a series of cylinder moulds with couch rolls for thickening, and intermediate agitators of special design.

FLAT SCREENS WITH DUNBAR DRIVE

"Impco" Dunbar Drive—One anti-friction adjustable eccentric per screen which produces a rocking motion in a secondary shaft which in turn imparts the stroke to the diaphragms. Silent, positive, maintenance-free mechanism giving highest capacity per plate continuously.

WET MACHINES

"Impco" High Density Feltless Wet Machines incorporate the Impco Vacuum Forming Cylinder in either 5 ft. or 8 ft. diameter with the new "Triple Press" combining a 60-inch warming drum with three compressed-air loaded heavy duty presses. These machines are furnished complete with slitters and cutters to deliver sheets at 50% AD. or higher widths up to 120". Also standard wet machines with felt either single or double press.

SPECIAL MACHINERY

Widely diversified plant equipment with upwards of fifteen thousand patterns enable us to handle special equipment to the best advantage.

We solicit requests for cost estimates.

IMPROVED PAPER MACHINERY CORP.

NASHUA, NEW HAMPSHIRE

tons, resulted from the elimination of many large gusset plates and the reduction in size of tension members since no rivet holes affected the gross areas of these members. Moreover there was no increase in the unit price per pound over conventional construction had rivets been used.

Because of the light roof loads involved in the finishing and storage building it was possible to use an 80 foot span truss as well as 40 foot rather than 20 foot longitudinal spans. The resulting wider bays permit unhindered location of machines and equipment and provide greater freedom for trucking and handling the finished products.

Roof Prevents Excessive Condensation

Moisture developed in the manufacturing processes meant providing a roof that would prevent excessive condensation. To avoid this condition the roof was constructed of Johns-Manville Corrugated Transite sheets laid with butt joints and securely fastened to the purlins with galvanized clips. Bolted over the Transite came a three-quarter inch layer of J-M Roofinsul. The top surfacing was a 4-ply 20 year Johns-Manville built-up roof.

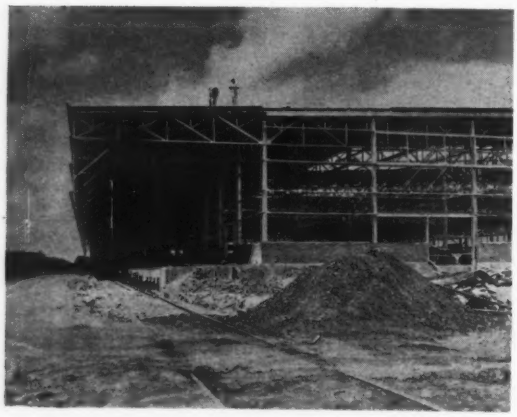
Process and Heating Steam

Burning either pulverized coal, or waste from slasher fans, two 30,000 pound per hour boilers supply the process and heating steam for the plant's operation. This building is similar in construction to the others except that a simple corrugated transite roof was applied, instead of an insulated roof which was not required.

At the west end of the property, a five acre wood storage area has been provided permitting the accumulation of sufficient pulpwood supplies to avoid possible interruptions that might be caused by severe weather. Trucks are being used at present for collection of raw material, but provisions have been made for a railway should one become necessary at some future time.

Handling the Pulpwood

A portable conveyor running on rails services the entire storage area, picking up pulpwood and delivering it to another which carries it to the slasher building where it is cut to uniform lengths and passed along to a drum where the bark is removed. The refuse from the barking drum, as well as that from the slasher building, is conveyed to a hog fuel storage bin.



LOADING PLATFORM AT JOHNS-MANVILLE PLANT.

INTERIOR OF FINISHING AND STORAGE BUILDING.

The logs are then reduced to pulp which is passed to a concrete tank (60 feet long, 20 feet wide and 15 feet deep) for thorough agitation and hydration. Pumped into a second large concrete tank, sizing materials are added, and the pulp then goes through a head box to a continuous forming machine. This machine, using a wet saw, delivers cut sheets that are ready for automatic delivery to an eight deck continuous drier almost 500 feet long.

Finishing and Storage Building

On arrival in the finishing and storage building the sheets are completely dry and ready for finishing on saw tables, sizing, milling and branding machines, or other equipment set up to produce the many different items in the J-M line.

The finished products are then subjected to careful final inspection and if they comply with specifications, are wrapped, labeled and placed in the storage section which is separated from the shipping platform by a single wall thickness.

Laboratory Control Depots

Laboratory control depots are placed in carefully selected positions throughout the plant to ensure that manufacturing formulae governing thickness, density, thermal conductivity, tensile strength, transverse strength, water-proofing and light reflection are rigidly followed.

Careful consideration of the requirements of a suitable shipping platform resulted in the construction of one sufficiently wide to permit assembly of carload or truckload shipments near the building wall and still not interfere with passage to and from the carrier.

The car floor height platform moreover is protected by a cantilever canopy which extends from the main building trusses completely over the platform and track to the far side of the carrier, and ends in a vertical apron providing effective weather protection during loading operations. One advantage of this cantilever canopy is the safety factor obtained by eliminating support posts that are often a serious hazard to railway employees.

Approximately two and one-half miles away the Nottoway River furnishes process water drawn through J-M Transite Pipe to a screen well and pump house for delivery through a J-M Pressure

Pipe to two 500,000 gallon settling tanks which serve as the reservoir for the process water system. Drinking and boiler water are furnished by a well on the site.

New Products Manufactured

An outstanding feature of the new line of products is an improved glaze-coat surfacing. All standard building board from the new plant is coated on one side with the new finish in a light Ivory color, which has a 71 per cent light reflection coefficient according to tests by the Electrical Testing Laboratory of New York. The reverse side is sealed and ironed to prevent warping and provides an exceptionally smooth surface.

Decorative items such as planks and bevel panels are available in four colors—ivory, white, rose tan and graytone, which were selected by Lurelle Guild, a noted color expert and commercial designer. Packed separately, a prospect may select his own combination of colors and designs.

A new and exclusive method, known as the "lightning" joint has been developed which permits completely invisible nailing. The elimination of exposed nail heads, long a serious objection of architects, is expected to widen greatly the market for insulating board products for interior finishes—particularly decorative units such as bevel plank, bevel panels and border strips.

With the opening of the Jarratt plant, several new items have been added to the Johns-Manville line of board products. A new economical wall board in sheets 4 by 7, 8, 9, 10 and 12 feet in natural color with an ironed surface on both sides will be known as J-M service board. Designed for the low-price field, it will sell at a price slightly less than that of standard insulating board. Weathertite asphalt-coated sheathing 25/32 inches thick has also been added in two standard sizes for either vertical or horizontal application.

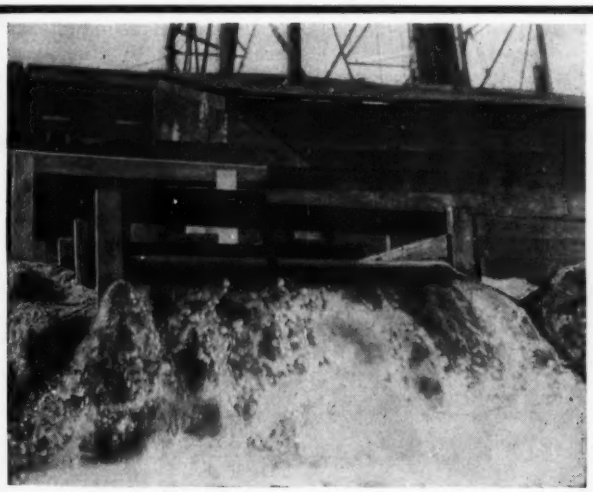
Ideally Situated for Shipping Material

Served by the main lines of the Virginian Railway and the Atlantic Coastline Railroad, the plant is ideally situated for the shipment of material to principal domestic insulating board markets, or for export through nearby Virginia ports.

W. F. Talbot Goes With Arthur Little

Dr. William F. Talbot who joined the staff of Arthur D. Little, Inc., chemists and engineers of Cambridge, Mass., in June, for the purpose of carrying out studies for the General Printing Ink Corporation has recently been made research director of the latter company. Arthur D. Little Inc., will continue to act in an advisory capacity and to carry on special researches. Dr. Talbot will be in charge of research and development work for the General Printing Ink Corporation and of its laboratories in New York City.

Dr. Talbot received his Ph.D. from the State University of Iowa in 1929 and has been employed by the Du Pont Company, Gustavus J. Esselen, Inc., and the Dennison Manufacturing Company.



YOUR WATER SUPPLY

Every industry needs a water supply. Either a few gallons a day or many millions. When large ground water supplies are required, serious technical points must be studied and considered. For example—

What are the geological and hydrological conditions?

Where is the replenishment area of the water supply?

What will be the effect on the water level or pressures after pumping millions of gallons every twenty-four hours for a year or more?

What hydraulic gradient will be required into each individual well?

What hydraulic gradient will be required into the area for the total supply?

What is the danger of salt or other contamination? In order to prove permanent and the most efficient, what construction should be used in the well?

What should be the location of the wells?

Many industries overlook the importance of these points.

Layne engineers, geologists, and hydrologists are specialists on these subjects.

Save wasteful expenditures by consulting with them on your water supply requirements and problems.

LAYNE-ATLANTIC COMPANY

NORFOLK, VIRGINIA

SWEEPING the COUNTRY!!

The NEW Brandon *"ZEPHYR"

Lightweight - Open Back - Dryer Felt

Fastest Drying with least steam not to mention lowest first cost.

From high speed News, Board and Kraft down to Bond and Tissue, this new felt is proving a revelation to mill superintendents.

By all means TRY IT!

MOREY
Paper Mill Supply Co.

150 Causeway Street, Boston, Massachusetts

(Sole Agents Brandon Dryer Felts)

* Patents Pending and Trade Mark Reg. U. S. Pat. Off.

A New Aniline Press

An aniline press of rugged design permitting precision color printing at high speeds has been announced by the Kidder Press Company of Dover, N. H. Information from the manufacturer suggests the advisibility of greater rigidity in an aniline press and points out the heavy construction of its new press, called the Kidder Aniliner.

This press, states the manufacturer, embodies a number of important developments. Its design was in charge of an experienced aniline engineer. Months were spent with operators in the field studying the requirements of this type of printing and experimenting on existing machines; the findings were incorporated in this machine.

All adjustments can be made from one side of the press. At arms length from the operator are controls for regulating the flow of ink, and adjustments for both pressure and register. Means are provided to separate the impression and plate cylinders and ink rollers when the press is shut down, and still permit rotation of inking rolls. This prevents trouble caused by drying ink, making it unnecessary to wash rolls before restarting.

To effect adequate control over the web, this press is provided with Kidder's in-feed control unit which relieves the type rolls of having to pull the paper under heavy tension. The web is carried in a continuous arc which assist, together with the rigidity of the press in keeping the paper travel steady. The Link-Belt system of rewind is used.

Ink control is facilitated by extra large fountain rolls, and there is a precision adjustment of inking roller against plates. An accurate "Kiss" impression is made possible by the method of adjusting plate cylinders and impression cylinders. This adjustment is not altered when the plate cylinders are raised and lowered for stopping and restarting. Anti-splash guards are provided. The ink fountain pens are easily drained and may be removed quickly for overnight cleaning. When it is necessary to remove the plate cylinder, the turn of a wing nut unlocks the bearing.

The Kidder Aniliner is offered in one to six colors, with gravure units optional, and the large machines are provided with a platform system. A variety of thread-ups is possible. Widths run from 26 to 72 inches, and the circumferential range is from 15 to 36 inches. A new bulletin discussing this press is obtainable from the Kidder Press Company, Dover, N. H.

Advanced To Official Standards

As a result of the recent ballot the following tentative standards were advanced to the status of official standards of TAPPI.

T 216 m-38 Spectral Reflectivity and Color of Pulp
T442 m-38 Spectral Reflectivity and Color of Paper
T 408 m-39 Resin in Paper
T 419 m-39 Starch in Paper
T 441 m-37 Water Absorptiveness of Non-Bibulous Papers and Paperboards

The following method is retained as a tentative standard.

T 433 m-39 Water Resistance of Paper (Dry Indicator Method)

Indianapolis Demand Steady

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., November 27, 1939—More stability seemed apparent in the local paper market last week and there is a general feeling on the part of both manufacturers and jobbers that the trade is in for a period of steady business and they are hoping that nothing untoward will occur that will disrupt the status quo. Demand in most lines continues uninterrupted and there are no disturbing price factors to cause uneasiness.

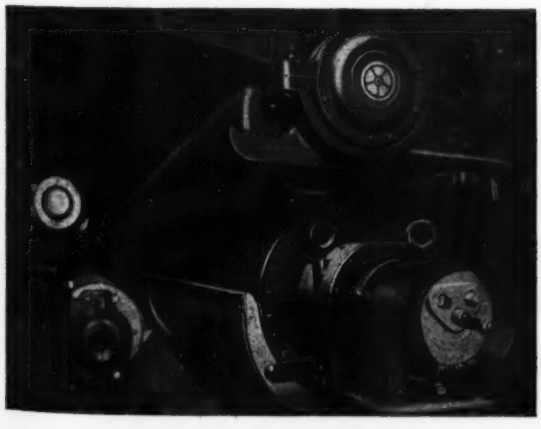
The fine paper field continues unchanged. Demand for covers, ledgers and book papers is steady and maintains the rather high level it reached some weeks ago. Prices are steady and the envelope prices, which a short time ago were advanced, are holding firm. Local jobbers say there is nothing apparent at the present time that indicates a change in the general situation. Local advertising men and printers say there is considerable catalogue work in prospect, and also some direct mail campaigns are being mapped out for introduction after the first of the year. Local jobbers are able again to get relatively prompt deliveries and they are taking advantage of this by balancing their stocks.

With Thanksgiving out of the way, there has been a slight increase in advertising lineage due to the proximity of the Christmas holidays. Most of this increase is coming from domestic advertisers, but the cigarette and confectionery industries are expected to begin using more lineage in the next week or so. Publishers are beginning to figure on contracts for the coming year and it is believed there will be no marked price increases.

Kraft continued steady last week with demand fair and no price change. Demand for wrapping paper and bags was heavy last week and a continued good demand is expected during the coming month.

Prices on paper stock were rather sluggish last week with mill demand indifferent. Demand for rags also was dull as compared with some weeks previous.

Largest Rolls Ever Covered



AT THE PLANT OF THE NATIONAL CONTAINER CORP., JACKSONVILLE, FLA., THIS 36½ x 234 INCH SUCTION PRESS ROLL AND ANOTHER JUST LIKE IT, WHICH WERE COVERED BY STOWE-WOODWARD, INC., ARE TWO OF THE LARGEST ROLLS EVER COVERED IN THIS COUNTRY.

FINLAND SUOMI

REPRESENTATIVES IN U. S. A. AND MEXICO

OF THE

FINNISH CELLULOSE ASSOCIATION

HELSINGFORS, FINLAND

FINNISH WOOD PULP UNION

HELSINGFORS, FINLAND

PULP SALES CORPORATION

230 PARK AVENUE

NEW YORK, N. Y.

As Rugged as a Cord Auto Tire

FLEXICORD WASH-UP HOSE

Remember that name the next time you buy hose for wash-up service in your paper mill. It is the hardest hitting, hardest working hose that you can put on the job. You may have bought hose for that requirement before, but you've never bought a hose like FLEXICORD . . . it is built like a cord automobile tire. It's heavy cords and extremely tough rubber enable it to do the job in a manner that will thrill the most exacting workman.

FLEXICORD is "tops" and will prove most economical considering the service it gives and its long life. Get all the facts today.

THE CINCINNATI RUBBER MFG. CO.
CINCINNATI, OHIO

CINCINNATI HOSE
A HOSE FOR EVERY REQUIREMENT

Making Lignin Molding Pulp

The Marathon Paper Mills Company has recently constructed and put into operation at Rothschild, Wis., a new plant for making lignin molding pulp. This unit representing an expenditure of around $150,000 is located in the chemical products area adjacent to the main process plant for treating sulphite waste liquor and alongside the vanillin plant. It is a three story rectangular building 60 by 100 feet —of steel frame and wood siding construction. The equipment facilities consist of bins and conveyors for both the raw and cooked chips, two rotary digesters, a mechanical refining unit, flat screens, a decker, two rotary vacuum washers with lapping facilities, liquor storage tanks and pulp chests, vacuum and liquor pumps, motors and various auxiliaries.

The processing operation is a pressure cook of wood chips with an alkaline liquor containing a processed lignin product recovered from sulphite waste liquor whereby a unique lignin enriched pulp is produced. This is used in various lignin plastic products. For making lignin laminating sheets the pulp is run on a paper machine into flat sheets which can be laminated under heat and pressure to give strong, tough, dense water resistant products. For making shaped forms the pulp is felted into shapes approximating the final form and then subjected to heat and pressure to give the desired product. If wanted for use in lignin molding compositions the pulp is dried and densified to a powdered product prior to molding under heat and pressure.

The lignin laminating sheets are now available in rolls or flat sheets and in grades to suit various use requirements. These sheets are thermoplastic but are not thermosetting (unless deliberately made so by the use of auxiliary agents) and hence do not involve curing reactions. They can be molded at the usual molding pressure, temperature and time. The unmolded sheets are brown in color but change under heat and pressure to a black. They are essentially a superior low cost core material and can be surfaced with sheets of various colors or with various coating resins. The present unit has a pulping capacity sufficient to make around twenty-five tons per day of these laminating sheets, with provisions for doubling this output by installing additional equipment in the present building.

Westminster Completes Addition

The wheels of industry beside the Fraser River are turning with a louder hum with the official opening of a $125,000 addition to the Westminster Paper Company's plant at Fifth avenue and 16th street, New Westminster, B. C. Begun in October, 1938, the three-story concrete addition was finished in February of this year. In the intervening months thousands of dollars worth of complicated machinery have been installed.

The extension marks another milestone in the company's history of steady expansion. Organized in 1922, the Westminster Paper Company's plant was completely rebuilt in 1930 following a fire the preceding year. Now with a total investment of $1,250,000 and an annual payroll of $200,000, the firm gives steady work to 170 employees.

The annual purchases of the company, including pulp materials and supplies, total approximately $750,000, the bulk of which is bought in B. C.

A. W. P. Installs New Equipment

New equipment and improvements made in the mills of the American Writing Paper Corporation during the present year include, in the Crocker division, an improved drainage system on paper machine dryers, together with the installation of Verigraph control equipment. This mill is now being furnished with well water of uniform temperature and excellent color throughout the year. A complete Shartle breaker beater has been installed in the Gill division.

In the Linden mill of the company, the installations include the latest type of Bird rotary screens, latest type save-alls and vortraps on each machine. An improved drainage system has been added to paper machine dryers, together with the installation of Verigraph control equipment. Additional washing equipment, finished paper sorting and counting machine, and modernization of rag room and bleach boiler equipment has been completed. General improvements in steam and power equipment have been made. This division is now being furnished with well water of uniform temperature and good color throughout the year.

The Mt. Tom division has been equipped with an improved drainage system on paper machine driers, including the installation of Verigraph control equipment. Jones, and Bird screens have been installed on both machines. General improvement has been made in beating equipment. A drum winder has been installed on No. 1 machine. Other additions include the installation of improved drives, and modern ventilating units and general improvements to the buildings.

In the Nonotuck mill, new improvements include an improved drainage system on paper machine driers, together with the addition of Verigraph control equipment. New Jordan equipment has also been added.

In the company's Parsons mill, the latest type of Jones screens have been installed on both machines. Vortraps have been installed on both machines, the bleaching system has been modernized, and an improved drainage system added to the driers, including the installation of Verigraph control equipment.

In the Riverside division, installation of the latest type of humidification equipment has been completed. The bleaching system has been improved and first steps taken in the modernization of power and steam equipment. An improved drainage system has been added on machine driers, with the installation of Verigraph control equipment.

Articles of Stationery

Grafton & Co., 51 Great Russell street, London, W. C. 1. has recently published a 126 page book, cloth bound, entitled "Articles of Stationery and Allied Materials, Their Chemistry and Technical Examination", by H. A. Bromley and J. Shore. (10s. 6d. net, the publisher).

The subjects covered include adhesives, printing inks, writing inks, typewriting, duplicating and manifolding materials, type metals, special papers and miscellaneous materials. Under the heading of special papers are included: greaseproof paper, antifalsification papers, photo-print papers, vegetable parchment. In most cases general testing methods are mentioned.

SEALING
EASIER—SPEEDIER

* WITH COST-REDUCING PQ SILICATE OF SODA

IN your finishing room, the right glue can influence profits. A number of mills report that Seal Brand Silicate for capping newsprint rolls has reduced the capping bills several hundred dollars per month.

Here are the other advantages of Seal Brand for sealing wrappers on paper rolls:

Ready to use—no mixing or cooking
Uniform quality gives uniform adhesion
No waste
Rapid set

Does this sealing operation with Seal Brand suggest how you may cut costs by adopting a fast setting, clean, odorless mineral glue? Investigate now Seal Brand for your adhesive work in the mill.

* Finishing room in newsprint mill. Capping is done with Seal Brand Silicate of Soda.

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Kansas City, Kans., Rahway, N. J., St. Louis, Mo., Utica, Ill.

PQ

Construction News of Pulp and Paper Mills

Kalamazoo Vegetable Parchment Co. Approves Plans For $80,000 Addition — Miami Mills Buy Machinery From North Hoosick Mill For Plant At Miami — Bergstrom Paper Co. Builds Two-Story Addition.

Kalamazoo, Mich.—The Kalamazoo Vegetable Parchment Company, Parchment, near Kalamazoo, manufacturer of waxed, greaseproof and other processed paper stocks, has approved plans for new one-story additions to mill, recently completed by M. C. J. Billingham, Kalamazoo, engineer and contractor, who also has secured award for erection. Work is scheduled to begin at once. Cost reported over $80,000, with equipment.

Middletown, Ohio—The Inland Container Corporation, Nelbar street, manufacturer of corrugated paper boxes and containers, has completed plans for new addition to plant, to be one-story, 140 x 200 feet, reported to cost over $60,000, with equipment. Increased capacity will be carried out. Proposed to begin erection at early date.

Clinton, Iowa—E. I. duPont deNemours & Co., Cellophane Division, duPont Building, Wilmington, Del., is completing plans for main unit of proposed new mill on Highway No. 67, near Clinton, recently referred to in these columns, consisting of a one and five-story structure, 250 x 750 feet. A number of smaller buildings will be erected, including storage and distributing units, power house, machine shop, pumping station and miscellaneous mechanical structures. Bids are scheduled to be asked soon on general erection, and to begin erection early next February. Plant will be equipped for large capacity. Excavation work is under way by A. M. Paulson Company, Clinton, which recently secured contract for this work. A railway line to plant site is being constructed, to connect with the line of the Davenport, Rock Island & Northwestern Railroad, totaling about 6300 lineal feet of track, to cost about $25,000. New mill is estimated to cost close to $5,000,000, with machinery. Company engineering department, first noted address, is in charge.

Chicago, Ill.—The Eagle Paper Box Company, manufacturer of setup paper boxes, has recently leased, with an option to purchase, a site in the Keeney Industrial District in Chicago. The site contains 58,000 square feet on which a new one-story factory building, with a two-story office section, is to be erected containing 44,000 square feet of floor space. The new plant will be one of the most modern box factories in the country. It is served by adequate switch tracks and will cost in the neighborhood of $100,000. H. L. Kagan, president of the Eagle Paper Box Company, reports that this is the third major move into larger quarters since the concern was founded in 1921.

North Hoosick, N. Y.—According to J. W. Bright, president, the Stevens & Thompson Paper Company has sold to the Miami Mills, Inc., Miami, Fla., all of the paper making equipment in the company's North Hoosick plant, leaving the paper company with the real estate, boilers, water wheels and sprinkler system. The Stevens & Thompson Paper Company has also retained the 24 inch Pusey-Jones experimental paper machine.

Indianapolis, Ind.—The White River Paper Mills here have installed three spinning machines and will begin production at once of sanitary drinking straws, according to S. C. Kahn, manager of the plant. Production on a large scale started last week. When the machines are in full production they will turn out 1,240,000 straws daily. Pure sulphate straw paper will be used and a wide variety of straws produced.

Norfolk, Va.—The Johnston Paper Company, general paper products, has leased a local building at Talewell and Duke streets, owned by the Massachusetts Mutual Life Insurance Company, and will modernize and improve at once for early occupancy. Present plant and headquarters will be removed to new location, where increased facilities will be provided.

South Lyon, Mich.—The Michigan Cellulose Manufacturing Company, heretofore operating at Detroit, Mich., has removed to a one-story industrial building at South Lyon, where production will be carried out in the future. Increased manufacturing facilities are being provided at new location. Company is headed by Kenneth Watkins, president.

York, Pa.—The York Felt Mills, Inc., lately organized, has arranged for purchase of the plant and property of the York Paper Manufacturing Company, West Princess street, and will take over at once. New owner will carry out certain modernization and improvements, with installation of machinery and equipment for the production of building papers and kindred heavy stocks, deadening felts, carpet linings, etc. It is expected to develop large capacity. Cost estimated close to $35,000, with equipment. New company will operate with a capital of $200,000, and is headed by Morgan S. Blauser, president; Elmer M. Morris, treasurer; and Richard M. Budding, secretary.

Whiting, Ind.—The Globe Roofing Products Company, manufacturer of roll roofing, ready-prepared roofing material, etc., has plans for new two-story addition to plant, reported to cost close to $45,000, with equipment. Erection contract is scheduled to be awarded soon. Isadore H. Braun, 123 West Madison street, Chicago, Ill., is architect. Main offices of the company are at 176 West Adams street, Chicago.

Neenah, Wis.—The Bergstrom Paper Company, manufacturer of book and allied paper stocks, has work nearing completion on one and two-story addition to clarifier building, 30 x 56 feet, previously referred to in these columns, and will have structure ready for equipment installation at early date. It is reported to cost over $45,000, with machinery. Work is being carried out by the Fluor Brothers Construction Company, 48 Otter

street, Oshkosh, Wis., general contractor.

Los Angeles, Calif.—The Fibreboard Products, Inc., Russ Building, San Francisco, Cal., manufacturer of box board, container board and kindred products, has filed plans for expansion and improvements in one-story building at branch mill at 4444 Pacific boulevard, Vernon, Los Angeles, for storage and distribution. Cost estimated over $30,000, with equipment. General contract was awarded recently to MacIsaac & Menke, 3445 Union Pacific avenue, Los Angeles. Company also will proceed soon with erection of new addition to branch mill at Stockton, Calif., reported to cost about $50,000, with equipment. Leland S. Hosener, 233 Sansome street, San Francisco, is engineer for last noted project.

Pensacola, Fla.—The Florida Pulp & Paper Company, Inc., has taken out a charter under State laws, capitalized at $3,000,000, to construct and operate a pulp and paper mill for the production of book, bond and kindred paper stocks. As previously noted in these columns, plans are in progress for proposed new mill on local tract of land leased frim the City, and proposes to begin erection early in 1940. New mill is reported to cost in excess of $1,000,000, with equipment. Incorporators of the new company, who will be officials of the company, are A. D. Pace, Pensacola, and James H. Allen, Savannah, Ga., formerly vice-president of the Union Bag and Paper Corporation, New York, N. Y., in charge of company mill at Savannah.

Palmyra, Mich.—The Simplex Paper Corporation, manufacturer of waterproof crepe papers, building and insulating papers, etc., is running on a capacity production schedule, with day and night shifts. Current business volume is larger than at any time during the past two years. It is expected to hold to present output basis for an indefinite period.

Rochester, N. Y.—The Eastman Kodak Company, Kodak Park, manufacturer of processed photographic papers, films, etc., has approved plans for one-story addition to Building No. 25 at local plant, reported to cost close to $50,000, with equipment. General erection contract has been let to the Ridge Construction Company, Kodak Park, and work will be placed under way at once.

Marcus Hook, Pa.—The American Viscose Corporation, manufacturer of cellulose rayon products, has plans maturing for expansion and improvements in mill at Marcus Hook, including the rehabilitation of several operating units and installation of equipment. Estimates of cost are being made. Main offices of company are at 200 Madison avenue, New York, N. Y.

New Companies

New York, N. Y.—The Robert Paper Company, Inc., has been organized with capital of 200 shares of stock, no par value, to deal in paper products of various kinds. New company is represented by N. H. Sirota, 175 Fifth avenue, New York, attorney.

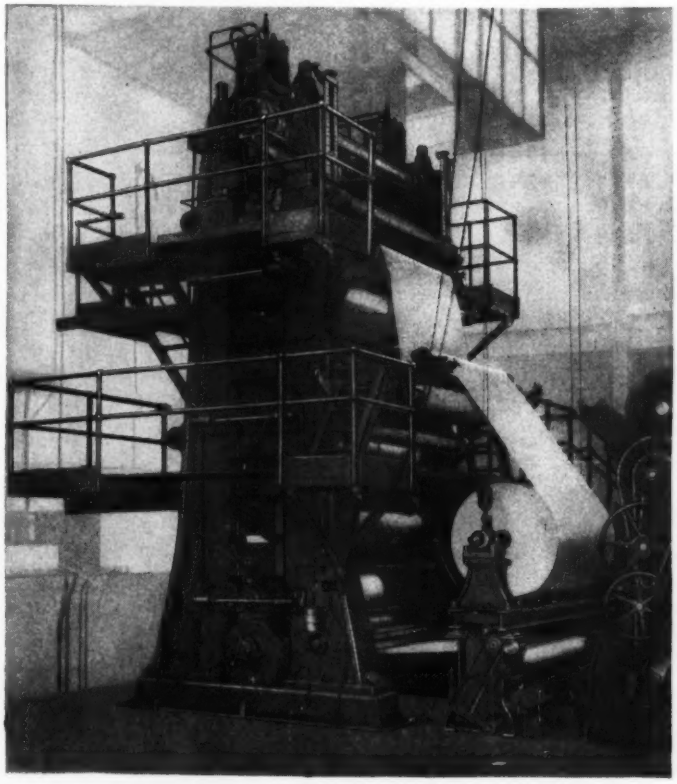
New York, N. Y.—The York Label and Bindery Company has been organized with nominal capital of $5000, to manufacture paper labels and other paper products.

Boston, Mass.—The New England Pulp and Paper Company, 50 Congress street, Boston, has been incorporated with capital of $260,000, to operate a pulp and paper mill. Robert C. Travers is president; and Franklin E. Smith, treasurer.

Boston, Mass.—The B. & D. Wall Paper Company, Inc., 2150 Washington street, Roxbury, Boston, has been incorporated with capital of 5000 shares of stock, no par value, to manufacture and deal in wall paper stocks.

New Hydraulic Super Calender

The accompanying illustration shows one of several installations of the New Hydraulic (Patented) Super Calender of the Textile-Finishing Machinery Company of Harris and Sims avenues, Providence, R. I. An eleven (11) roll stack operating at speeds up to 2000 f.p.m.; all rolls equipped with roller bearings; hydraulic pressure attachments (patented) permitting instantaneous action on and off with means for easy variation to any lineal pressure desired; quick and accurate differential adjustment of pressure on either side of the Calender at will; all under finger-tip control. Further information will be furnished upon request.



TEXTILE NEW HYDRAULIC (PATENTED) SUPER CALENDER

PAPER TRADE JOURNAL
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EDITOR

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Editor Technical Section

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Washington Correspondent

Vol. 109 November 30, 1939 No. 22

COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

THE MILL NUMBER

This is the sixteenth annual Mill and Mill Equipment Number of the PAPER TRADE JOURNAL. The purpose of this number is to present by descriptions and illustrations of some of the most recently built mills and mill improvements, a picture of the expansion that has been taking place as well as the improvements that are currently being made in the methods and technique of the manufacture of pulp and paper. It would not be possible, of course, to cover the entire field in this particular issue, but enough material is presented, it is believed, to show that very great progress has been made recently along the lines mentioned.

The mill of the National Container Corporation at Jacksonville, Fla., which is fully described and illustrated with many pictures of the equipment, is the latest of the great Southern mills to go into operation and reflects the impressive character of the expansion that has taken place in the South since the Union Bag and Paper Corporation started work in 1935 on its $12,000,000 kraft plant at Savannah, Ga., which project initiated this movement.

The most recent of the large kraft mills in the South is being built by the Hollingsworth & Whitney Company at Mobile, Ala. Construction is being rushed as rapidly as possible and it is expected that the plant will be ready to go into operation early in 1940. The mill will make kraft wrapping and specialties, but its production will be out of the ordinary, as far as the South is concerned, as it will not only make unbleached, but semi-bleached and fully bleached varieties as well.

While obviously the great expansion in the kraft paper field in the South has slowed down, at least for the time being, the building of new pulp and paper mills in the South has not by any means stopped, but the movement in place of specializing in kraft has become more diversified.

Among the outstanding new projects in the South, following the kraft development in that section, is the mill of the Ecusta Paper Corporation at Brevard, N. C. This mill is equipped with four Fourdriniers and is devoted altogether to the manufacture of cigarette paper, never previously made in the South. When it is fully in commercial operation it will, it is expected, displace a large tonnage of the cigarette paper at present being imported from France and other European countries.

Another interesting project, which is described and illustrated in this issue, is the plant of the Johns-Manville Corporation which was recently completed at Jarratt, Va. This is devoted to the manufacture of plain and decorative insulation board products. The company states that it was influenced to locate this mill at Jarratt by the abundant supply of wood of a type especially suitable to the manufacture of its products and by other favorable economic factors in the South.

The mill of Rayonier, Inc., at Fernandina, Fla., construction on which was held up for some time because of the late depression, is now being rapidly completed and will go into commercial production shortly. It will be decidedly unique in that it will make bleached sulphite pulp from Southern pine.

Not only does expansion in the South continue active so far as new mills are concerned, but some of the new plants recently established are already making important additions, showing quite conclusively that these new ventures have met fully with all the expectations of the concerns interested in them.

Prominent among these expansions and improvements are the plans of the Burnswick Pulp and Paper Company, which makes bleached sulphate pulp at Brunswick, Ga., to increase the productive facilities of its plant by the expenditure of about $1,250,000; the addition of a paper making department to the plant of the Champion Paper and Fibre Company, which makes bleached sulphate pulp at Pasadena, Texas; and the addition of a finishing department to the plant of the North Carolina Pulp Company which makes sulphate pulp at Plymouth, N. C.

But the crowning feature of interest in the pulp and paper making developments in the South naturally centers more especially just now in the new plant of the Southland Paper Mills at Lufkin, Texas. This mill will be the first plant to make newsprint from the pine woods of the South. Its erection was of course influenced by the much publicized work of the late Dr. Charles H. Herty in his experiments at Savannah, Ga., in the manufacture of white paper

from Southern pine. The mill is being equipped with one 234-inch Pussey & Jones Fourdrinier. The plant will manufacture its own ground wood pulp but will have no chemical pulp plant. It will not use sulphite, but will use bleached suphate pulp which will be obtained from the Champion Paper and Fibre Company at Pasadena, Texas. The mill is designed to produce 50,000 tons of newsprint annually. It is being rushed to completion and is expected to go into operation almost immediately. The experiment will be watched with deep interest and, if the success of the venture approaches the hopes of the promoters, it will obviously almost certainly lead to a still further great expansion of the South as a paper making center.

Recommends Standard Color Names

A standard terminology for colors for powdered drugs and chemicals and for whole crude drugs for use in the U. S. Pharmacopeia has now been formally approved by the Inter-Society Color Council and recommended to the United States Pharmacopeial Convention. The system, which is also now being studied for application to colors of opaque, nonmetallic surfaces, was developed by the Society's Committee on Measurement and Specification with the assistance of the American Pharmaceutical Association. It follows plans outlined originally in 1933 by D. B. Judd of the Colorimetry Section, National Bureau of Standards; K. L. Kelly, research associate of the American Pharmaceutical Association; and Dr. E. N. Gathercoal, first chairman of the Inter-Society Color Council.

In the new system the designation for all but very grayish colors consists of a hue name (red, green, blue, purple, etc.) preceded by appropriate modifiers (such as weak, moderate, strong, light, and dark). The designation for very grayish colors consists of a noun (white, gray, or black), with modifiers appropriate to the lightness and hue of the colors (such as dark reddish gray or yellowish white).

A complete discussion of the recommended color system is given in Research Paper RP1239 published in the September issue of the Journal of Research of the National Bureau of Standards. Separate copies of the paper, "Method of designating colors" by Deane B. Judd and Kenneth L. Kelly, are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

A. S. M. E. Graphic Arts Division to Meet

As a part of the annual meeting of the American Society of Mechanical Engineers there will be a meeting of the Graphic Arts Division at the Bellevue-Stratford Hotel, Philadelphia, Pa. on Tuesday, December 5, 1939 at 2:00 p.m. R. G. Macdonald, secretary-treasurer of the Technical Association of the Pulp and Paper Industry will preside as chairman. Two papers will be presented: B. L. Wehmhoff of the West Virginia Pulp and Paper Company, New York, New York, on "Paper Testing" and Bayard P. Fonda of Fonda and Warfield, Baltimore, Maryland, on "Controlled Air Conditions in the Printing Industry."

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association:

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1939	1938	1937	1936	1935	1934
January	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	88.7%	76.3%	78.6%	80.5%	71.9%	58.2%
October	96.7%	82.5%	73.5%	87.6%	75.6%	64.7%
November	.....	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	.....	72.3%	80.6%	81.3%	70.5%	.....
First 46 weeks	83.7%	72.0%	84.1%	80.7%	70.3%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1939		CORRESPONDING WEEKS, 1938	
October 14	96.9%	October 15	83.0%
October 21	98.5%	October 22	83.8%
October 28	98.3%	October 29	81.8%
November 4	98.5%	November 5	82.4%
November 11	98.7%	November 12	80.9%
November 18	99.2%	November 19	81.6%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Oct. 14, 1939	Oct. 21, 1939	Oct. 28, 1939	Nov. 4, 1939	Nov. 11, 1939	Nov. 18, 1939
0% to 50%	34	33	35	31	29	16
51% to 100%	269	271	266	264	254	114
Total Mills Reporting	303	304	301	295	283	130

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1935	62%	68%	68%	63%	61%	66%	62%
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1935	67%	71%	77%	71%	61%	66%
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	74%	84%	....	....	....

Week end. Oct. 14, 1939—83%
Week end. Oct. 21, 1939—84%
Week end. Oct. 28, 1939—85%
Week end. Nov. 4, 1939—84%
Week end. Nov. 11, 1939—84%
Week end. Nov. 18, 1939—83%

[1] Production-capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

Japanese Paper Mills Active

WASHINGTON, D. C., Nov. 27—The increased activity which was noted in the Japanese paper industry during the early part of 1939 continued through the second quarter. Production of machine-made paper during this period by members of the Japan Paper Manufacturers Association, reached the highest level since the third quarter of 1937. The total output amounted to 259,515 short tons, an increase of 22,505 tons or 9.4 percent over the first quarter's production, and an increase of 15,821 tons or 6.5 percent over the output during the second quarter of 1938. Compared with the first quarter of the current year there were noticeable volume gains in the output of newsprint, superior printing papers, "simili" paper, packing paper, and cardboard. The only types of paper to show a decline in output were ordinary printing paper and writing and drawing paper. Heavy production during this quarter is ascribed to the demand for paper from yen-bloc countries.

LYDIAN ITALIC
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But the Paper Has Got to Be Good!

"This new type face is just right for the job, but the paper has got to be good. It would be criminal to lose any of the beauty of this type with inferior paper".

That's not an unusual demand. Most printers hear it time and again. Nor is it any cause for alarm —the paper manufacturer always has clean-cut type reproduction in mind when coated papers are being formulated.

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With a CRYPTONE or ALBALITH Zinc Sulfide Pigment in the coating formula, the manufacturer is not only assured of all these qualities, but he secures what can be termed "extra dividends"—(1) easy dispersion in water vehicles assuring a uniform coating, (2) increased resistance to mildew in the finished coated stock, and (3) less bacterial action on the casein formulations in the coating department.

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160 FRONT ST., NEW YORK

ZINC SULFIDE PIGMENTS IN PAPER

Section of the
Technical Association of the Pulp and Paper Industry

The Literature of Wood and Wood Technology

By A. J. Bailey[1]

Abstract

The increasing number of abstract periodicals bears mute testimony to the recognition of the necessity of keeping abreast of all current scientific developments through indexes. It yet remains to prepare a comprehensive bibliography under a single cover and with proper subject and author indexes to make all past information available. It is hoped that these notes will serve second best by pointing out the bibliographies, abstract journals, indexes, and other forms of literature, the devices for keeping informed of new publications as they appear, and the means of obtaining information by using the various services provided by the larger libraries.

The broad scope of wood utilization and the complete absence of a comprehensive literature guide practically limit effective use of all existing literature on wood to a small group of specialists in the various universities and research organizations who have acquired a finger-tip knowledge of finding facts by years of untiring and painstaking wrestling with the problem of finding technical data. The rapidly widening range of activities in wood use makes essential a knowledge of the sources and means of exhausting all existing information to avoid duplication of reported work. That considerable time may justifiably be spent on a literature search is easily demonstrated by comparing the rate of acquiring facts in the library, up to a certain point, with the rate of actually determining the data experimentally in the laboratory, to say nothing of the cost of equipment, space, and materials. The value of readily available information is well recognized in many of the older sciences, notably chemistry, which has an enormous body of knowledge indexed and cross-indexed in a thoroughly useful manner. The relatively new field embracing the science and technology of wood has not yet organized and indexed its literature, nor has any general attempt been made to include such a study in the curricula of universities and technical schools. Due to the increasing scope and intensity of wood use, it is fully apparent to anyone in the field that the leaders in investigative, developmental, instructional, and other progressive works must be adept in the use of literature or be hopelessly outdated.

Since usually only research workers, industrial specialists, educators, and advanced students have need of, and are in a position to use such information, this article is designed primarily for their use, for the use of younger men entering these fields, and those of related highly specialized training who need information related to, but outside of, their specialties. Due to convergence of engineers, chemists, physicists, foresters, biologists, architects, and others upon the properties of wood and problems of wood use, a real need exists for ready and effective access to all important information.

Functional Group of Literature

All sources of information have been divided into groups of like character and function as the most useful guidance for the reader. The literature will be discussed under these headings: classification systems, handbooks and reference works, directories, collected literature, indexes, bibliographies, periodicals, patents, statistical data, government publications, theses, and supplementary information. It is recognized that any system of classification for a universe as heterogeneous as literature must be arbitrary, and that it will have its shortcomings.

Classification Systems and Searching Methods

Probably the most comprehensive decimal classification to date is that published by the Imperial Forestry Institute *(24)*, although a more recent system *(6)* has been devised by Kollman which is more specific on wood utilization. Although unrelated to the Dewey system, the latter is of value as an opinion on classification.

Undoubtedly, no better presentations of literature searching have been made than those by Crane and Patterson *(21)*, Mellon *(53)*, and Soule *(69)* which take up in detail the use of indexes and all publications and services relating to effective use of the library. More recent and shorter discussions prepared by Berolzheimer *(9)* primarily for chemical and allied literature, and by Molstad *(54)* for chemistry and chemical engineering serve in similar capacity as efficient vehicles to literature use. In the field of mechanical engineering, Craver *(22)* has critically and exhaustively pointed out the criteria and use of library services, stressing in an excellent manner the importance of literature use and knowledge of library methods for research workers.

Handbooks and Reference Works

Among the more important handbooks, diction-

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aries, and encyclopedias are Hayward's *Wood, Lumber, and Timbers (31)* and the *Wood Handbook (85)* which contain the more important wood constants such as physical and mechanical properties. Kolmann's *Technologie des Holzes (40)*, while really a monograph, contains much reference data on the physical processing of wood. Schorger's *Chemistry of Cellulose and Wood (65)* stands in like relation to the chemistry of wood. Of the less quantitative data, Johnson *(37)* gives information such as the relative susceptibility to splitting, warping, etc. More definitive is the report of Markwardt and Heck *(51)* who proposed a glossary of standard terms and a decimal classification of wood properties similar to the well-known hardness scale of solids.

Other reference works include the *Handbook of Chemistry and Physics (36)*, the *Carnegie Pocket Companion (15)* for structural data, and more specialized works such as the *Handbook of Wood Pipe Practice (29)*, and the *Handbook on Wood Preservation (30)*, although the latter is badly in need of revision.

Much reference micro-technical information is contained in Krause's *Enzyklopädie der mikroskopischen Technik (41)*, Lee's *Microtomist's Vade—Mecum (43)*, McClung's excellent *Handbook of Microscopical Technique (52)*, Chamberlain's *Methods in Plant Histology (16)*, and Chamot and Mason's *Handbook of Chemical Microscopy (17)* while splendid accounts of the general methods of fiber microscopy are drawn from the textile field by Preston *(59)* and by Schwarz *(66)*.

Most wood technologists have occasion to refer more or less frequently to standard works in pure science such as the *International Critical Tables (79)*, which are especially worthy of confidence. Since the latter summarizes only the literature prior to 1929, the *Tables annuelles internationales de constants et donnees numeriques (76)* covering data through 1930, and the Landolt-Bornstein *Physikalisch-chemische Tabellen (42)* which are complete through March 1936 are useful. Other valuable sources of information are Seidell's *Solubilities of Inorganic and Organic Substances (67)*, Heilbron's *Dictionary of Organic Compounds (32)*, Thorpe's *Dictionary of Applied Chemistry (77, 78)*, Klingzett's *Chemical Encyclopaedia (38)*, and Gardner's *Chemical Synonyms and Trade Names (26)*.

Practical reference works often used to great advantage are the formularies such as Bennett's *Chemical Formulary (8)*, which contains practical formulae for making thousands of products in all fields of industry. The *Techno-Chemical Receipt Book (12)*, Henley's *20th Century Formulas, Receipts, and Processes (35)* are similar in scope while Standage's *Cements, Pastes, Glues, and Gums (71)* is comprehensive for practical data on adhesives.

Directories and Catalogs

It is frequently necessary to find such information as the manufacturer of a certain machine or product, or the executive of a certain firm or organization. As the list of publications serving these needs is long but easily found, no attempt is made here to exhaust the possibilities but rather merely to point out representative examples. In pulp and related fields Lockwood's *Directory of the Paper and Allied Trades (47)* is outstandingly complete. The *National Directory of the Canadian Pulp and Paper Industry (74)* covers the Canadian data in a similar manner. Many more specialized registers are available which treat intensively a single portion of an industry, for example: the *Official Container Directory (57)*. Another useful directory is the *Southern Lumberman's Directory of American Saw Mills and Planing Mills (70)* which lists mills by states and cities, and gives also the type of mill, capacity, sawing equipment, species and products produced.

Another useful directory is the *Who's Who Among Association Executives (84)*, which lists the executives and administrators in all sorts of trade, research, fraternal, professional, and educational organizations. For information on research laboratories, the *Directory of Commercial Testing and College Research Laboratories (23)* classifies and describes laboratories in these fields while the more recent *Industrial Research Laboratories of the U. S. (82)* lists them by geographical distribution, and has a subject classification of the laboratories' activities, number of employees, and other data.

To find equipment and supply houses the *Chemical Engineering Catalog (19)* lists equipment, chemicals, raw materials, and supplies with the firms which supply them, has an index of the companies represented and of trade names. MacRae's *Blue Book* and Hendrik's *Commercial Register (50)* is similar but broader in scope, including a list of manufacturers, chemicals, machinery, and all sorts of materials. It has a separate section for Canada and contains considerable commercial information. Thomas' *Register of American Manufacturers (75)* is another valuable directory to articles, and manufacturers and contains a trade name index and data on affiliated concerns. Paints and protective coatings are well covered by the *Green Book Who's Who (28)* and in similar position to the plastics field is the *Plastics Guide Book (58)*.

House organs might logically fall in this group but few are of much importance. The *Du Pont Magazine*, and the Allis-Chalmers *Timber Topics* are representative and frequently contain interesting information and announcements of recent developments.

Collected Literature

Included under this heading are the basic texts and monographs which are invaluable in obtaining an authoritative, but not necessarily up-to-the-minute, grasp of any specific subject. They may be found in the *Engineering Index*, the *Industrial Arts Index* or in any of the other indexes as well as the more complete bibliographies. By far the most complete source is the *United States Catalog* for books in print prior to 1928, while the *Cumulative Book Index and United States Catalog Supplement* covers the period 1928 to date. These are especially useful since books are listed by subject, title, and author. Another source which can sometimes be used to advantage is the *Publisher's Trade List Annual*, although unfortunately the books are listed by publishing companies rather than by subject.

Frequently, it is of value to read reviews of books before trying to select a few books from the subject at large. One of the best guides to book reviews is the *Technical Book Review Index* which specifically covers technical books while the *Book Review Digest* reviews books of more general interest.

In order to keep abreast of new books as they appear, new editions of any of the above publications

may be consulted although usually the time lag is too great. A better way is to check the latest issues of periodicals covering the subject, for example, the *Journal of Forestry* and *Holz als Roh- und Werkstoffe* carry reviews of the more important ones soon after they are off the press.

Indexes

Since this is one of the most important divisions of literature, it is of value to define the limits of the classification and to point out its relation to the remaining body of literature. While some authors do not differentiate between abstract journals, indexes, and bibliographies, the convention is adopted here of setting up two large groups: the indexes and the bibliographies. All publications which cover a broad field are classed as indexes while those limited to a single subject, industry, or narrow field are classed as bibliographies. Publications of either group may or may not have an abstract accompanying the citation. For instance, the *Engineering Index* includes all enginering subjects but lists only title, author, and citation, while *Chemical Abstracts* lists the same plus an abstract. Similarly, the TAPPI *Bibliography of Paper Making* is a list of authors, titles, and citations; the *Bulletin of the Institute of Paper Chemistry* is similar except that complete abstracts are given. Both are treated as bibliographies since they are limited to a special subject.

Soule *(69)* has pointed out in an excellent manner the general trend of development of chemical literature. In initial position is information on the investigators themselves (biographies), then their original reports (periodicals), followed by the first summaries of their articles (abstract journals), next the periodic digests and surveys within a small division of a certain field (monographs), and finally the synopses (dictionaries and encyclopaedias). Practically, this means that one unacquainted with a field normally would first consult the encyclopaedias, then the monographs, and finally, locate the remaining literature (in periodicals) by means of indexes and bibliographies.

Among the indexes consulted the *Engineering Index*, the *Industrial Arts Index*, *Chemical Abstracts*, *Botanical Abstracts*, *Biological Abstracts*, the *Index of the Publications of the U. S. Department of Agriculture*, the *Agricultural Index*, the *U. S. Government Publications Index*, and the *Experiment Station Record* are the most important.

The British and German equivalents of *Chemical Abstracts: British Chemical Abstracts* and *Chemisches Zentralblatt* are found in practically all of the larger libraries, and are sometimes useful in obtaining a more thorough coverage of foreign literature. The *Engineering Index* is an important guide to the periodical literature on the physics and mechanics of wood use. Over two thousand publications are indexed, more than half of which are published outside of the United States, although approximately two-thirds are in English. Approximately 1,200 periodicals are included as well as some 500 society transactions, and about 600 bulletins and reports published by governmental agencies, universities, research laboratories, and similar organizations. Weekly issuances of the material for the *Index* are made on standard library filing cards. Each card gives the author, title, reference, a short note on the article, and the periodical reference. All of the periodicals which are indexed are permanently filed in the Engineering Societies Library, New York, New York, where they are available for use. This library furnishes photostats and translations.

The *Industrial Arts Index* is similar but more limited in scope and places more emphasis upon the processes and products of manufacture and commerce. It appears monthly and is cumulated quarterly.

The leading index for finding chemical literature on wood is *Chemical Abstracts* which appears twice a month and covers all phases of chemistry. Over 2,800 periodicals are abstracted, the material being grouped into 30 divisions. Each issue for December 10th contains the cumulative author index for that year, while the issue for December 20th consists of the subject, formula, and numerical patent indexes. Of the 30 divisions of *Chemical Abstracts* the "Cellulose and Paper," "Petroleum, Lubricants, Asphalt, and Wood Products," "Organic," "Biological," and "Analytical" sections are the most useful.

Another index not so widely known but having definite value is the *Vertical File Service Catalog*, which is an annotated list, classified by subjects, of pamphlets, leaflets, folders, maps, posters, charts, and similar data covering everything from that for elementary schools to that for scientific research. Many irregular publications of merit, covered by no other index, can often be located in this publication.

A more comprehensive list of publications of the same general type as *Chemical Abstracts* and available in most libraries is the *Union List of Serials*. It has the same general arrangement, is used similarly, but is compiled less frequently than the *Chemical Abstracts* list.

Bibliographies

In this group fall all the specialized reading lists and comprehensive reviews having an extensive list of references. Some monographs cite sufficient reference literature to function as a bibliography. The bibliographies may be found under the proper subject heading in indexes, in bibliographies of bibliographies, or by a cross-reference from another bibliography or periodical article. Since it is obvious that the number of bibliographies is enormous, no pretense is made of exhausting all possibilities, but rather, merely citing a few of the more important ones, since the methods of finding bibliographies are pointed out.

While all bibliographies are specialized, one type deserves special mention. That is the bibliography of bibliographies, i.e., a list of authoritative and extensive bibliographies, including, for example, the usually exhaustive and critical monographic bibliography, reviews, and similar works. Strictly speaking, any index or bibliography which lists "bibliography" as a subject heading is a bibliography of bibliographies, but practically and generally, the bibliography of bibliographies (as defined above) has the most value in locating other bibliographies. An excellent bibliography of bibliographies is that by West and Berolzheimer *(81)* which, including two supplements, covers the literature from 1900-1931 on chemistry and chemical technology. Another in the same field is that by Sohon and Schaaf *(68)* covering the period 1900-1924. Both of these contain an alphabetical list of subjects with citations of bibli-

ographies.. Other bibliographies of bibliographies may be found in the general indexes while Crane and Paterson *(21)* give an unusually complete and authoritative list for a number of sciences.

Among the bibliographies devoted to single industries or phases of a science, one of the most useful is the TAPPI *Bibliography of Paper Making (80)*, which, in five volumes, covers all phases of the subject from 1900 to date. For almost the last decade, the *Bulletin of the Institute of Paper Chemistry (13)* covers the same field with more emphasis on fundamental sciences and includes excellent but concise abstracts. The latter publication is especially valuable because of the short time-lapse between appearance of the original report and the abstract, usually one month. On the same subject is the *List of Publications on Pulp and Paper* by the Forest Products Laboratory (publications of this agency are described more completely below), while publications such as the *Paper Trade Journal* and *Der Papier-Fabrikant* frequently carry abstracts. Especially worthy of mention for the examination of fibrous products is Calkin's wonderfully complete *Microscopy of Paper (14)*, while *Stain Technology* carries both original reports and abstracts on all phases of microscopy as does also the *Zeitschrift für wissenschaftliche Mikroskopie.*

In the more general field of wood are a number of governmental bibliographies: *Forestry Current Literature (25)*, issued every two months, indexes books and periodicals received in the Forest Service Library in Washington, D. C. The last issue (July-August 1938) indexed 75 periodicals from all parts of the world for selected entries and contained five pages of titles on utilization and technology including general information, wood conditioning, pulp and paper, naval stores, and other products and by-products. A useful series of bibliographies has been published and is revised at about annual intervals by the Forest Products Laboratory. The bibliographical lists are announced in the *Monthly Catalog of U. S. Public Documents* as they appear.

The British counterpart of the latter laboratory, the Forest Products Research Laboratory, at Princes Risborough, has completed an extensive amount of research on many phases of forest products. The publications of the Laboratory issued before 1937 have been listed in a bibliography *(46)* which tells at a glance the problems which have been investigated; a mimeographed supplement lists the publications which appeared in 1937.

Besides the coverage already obtained in the above literature, several outstanding bibliographies on wood preservation merit attention. An index to the Proceedings of the American Wood Preservers' Association for the years 1905-1929 inclusive appeared in the 1930 volume (p. 470) and a similar index for the years 1929-1936 appeared in the 1937 volume (p. 415). For the literature prior to 1916, the *Handbook of Wood Preservation (30)* contains 18 pages of titles; in 1936 a 45-page bibliography on fireproofing *(4)* appeared and another on the same subject in 1937 *(5)*. An authoritative and excellent sourcebook on another phase of wood preservation should be mentioned here: Kofoid's *et al.* monograph on termites *(39)* which includes a bibliography.

The list of bibliographies might go on indefinitely but only a few more will be added here. The first is the *Naval Stores Handbook (56)* which lists about 600 references, another is the *National Lumber Handbook (55)* listing many publications relating to lumber use. Ahern's and Newton's *Bibliography on Woods of the World (1)* is an excellent guide to the literature on tropical woods. Lastly is the list of abstracts, which appears in the *International Review on Timber Utilization* and usually covers the more important European books and similar publications which for some reason most bibliographers seem to miss.

Periodicals

The extreme diversity of wood use causes the periodical publications on the subject to be so widely scattered that only individuals who have access to the larger libraries can hope to read the original articles. Much of the published material appears in the journals of a single industry: the pulp and paper industry alone probably publishes a greater volume of information on wood than any other. Much material also appears in the journals of pure science: notably chemistry and botany, while engineering supplies its share. The transactions of some of our most learned societies often contain research reports on wood yet one must be equally conversant with the claims in commercial advertising in order to be informed of all developments.

Few periodicals are devoted exclusively to wood: the *Timberman* in this country, *Holz als Roh- und Werkstoffe* in Germany, and the *International Review on Timber Utilization*, now published in Belgium, are examples of exclusive devotion to wood, yet many trade journals approach this level since practically all of the reports in many pulp and paper journals deal directly or indirectly with wood use in a specialized way. Much of the general information on wood, however, is contributed by those only secondarily interested in wood, such as the engineer, the architect, the chemist, the physicist, the biologist, and many others who reach those of similar interest by publishing their material in journals written for the specialist.

For several reasons, no list of periodicals is intended here. Not only does space prohibit, but the more important periodicals are fairly well known to librarians and users alike. Perhaps more important is the fact that the finding of information by commencing to look in periodicals is hopelessly impossible. The importance of the periodical literature, however, should not be understated. One of the best methods of becoming acquainted with the periodicals is to note those cited in the indexes or bibliographies. Not infrequently, the list of periodicals abstracted by an abstract journal is of value. Such a list is included in the back of the *Bulletin of the Institute of Paper Chemistry (13)*. The most complete reference works, of course, are *Poole's Index to Periodical Literature* and the *International Index to Periodicals* although these have only limited value to one looking for the periodicals in a specific field.

Patents

The weekly *Official Gazette of the United States Patent Office* is the first to announce the granting of a U. S. patent. For each patent granted, the patent number, the inventor, the assignee, if any, and the application date are given. Sufficient claims are also given to explain the invention and sometimes drawings are included. A copy of any patent may be obtained from the Superintendent of Documents

tor ten cents. Booklets describing the practice and general information on the patent office are available upon request.

To find the patents on a given subject, *Chemical Abstracts* is the best guide for chemical patents. In the annual subject index, the abstracts of patents are listed by number and by subject. Both the inventors and assignee's names are listed in the annual author index. Information for obtaining foreign as well as domestic patents is given in the first issue of each volume of *Chemical Abstracts*. No discussion of chemical patents would be complete without mention of Worden's *Chemical Patents Index (86)* which makes chemical patents for 1915 through 1924 easily available. Other sources of patent information are the various bibliographies, the TAPPI *Bibliography of Paper Making*, for example, is unusually complete in this respect; for the year 1938, 76 pages of patents are classified by subject and an author index is included. Many technical journals devoted to a single industry also publish lists of patents useful to that field.

Statistical Data

Since much of the authoritative statistical information is of governmental origin, an understanding of governmental agencies and activities in the statistical field is prerequisite to locating all data available. Easily the most comprehensive and lucid guide to such information is Schmeckebier's *Statistical Work of the National Government (63)* in which are surveyed and explained all governmental agencies, activities, and publications of a statistical nature. The best epitome of statistics is found in the *Statistical Abstract of the United States (72)* which is an annual summary of authoritative statistics showing trends in trade, industry, and social progress. More specific and more useful to the specialist is the unabridged *Biennial Census of Manufactures (10)* which contains detailed information on all industries. As this volume is not available in all libraries it is convenient to obtain certain sections into which the larger volume is divided for distribution to individuals. These sections are published under the title of *Census of Manufactures—1935* and the coverage is indicated. Those of greatest interest are specified as follows: (1) baskets, rattan and willow ware, cigar boxes, cork, excelsior, lasts, etc., matches, turpentine and rosin, screens and weather strip, wood preserving, and turnery and shaped articles; (2) the principal lumber industries: lumber and timber products, planing mill products, wooden boxes, and cooperage; (3) paper and allied products; (4) chemicals, tanning materials, natural dyestuffs, etc., wood distillation and charcoal manufacture, etc.; (5) buttons, combs and hairpins, synthetic resin and other plastic products, etc. These sections largely supersede the U. S. Department of Agriculture *Statistical Bulletin* 21 *(2)* which gives excellent statistical summaries of all forest products before 1928.

For resources and trade the annual *Commerce Yearbook (20)* is an excellent reference. Volume I deals with the United States in detail while vol. II and III discuss individual foreign countries taking up the entire internal situation in each, the industries, forest resources, imports and exports, and other information. Other comparative world statistics, although outdated in some categories, appear in Zon and Sparhawk *(87)*.

The lumber industry is well covered by a number of publications, *Lumber and Timber Information (48)* gives detailed information for 1937, *Charting the American Lumber Industry (18)* gives similar information for 1936. An extremely complete analysis of consumption statistics by states, regions, species, and industries appeared in 1928; it is *Lumber Used in Manufacture—Summary Tables (49)*. Reynolds and Pierson *(62)* recently published an excellent statistical history of lumber from 1801-1935 as well as complete statistical data on *Lumber Distribution and Consumption*—1934 and 1936 *(61)* which includes data for seven previous years as well. Their data include shipments from states to states, United States to Canada, Canada to the United States, exports to other countries, regions to states, states to regions and complete consumption statistics. Another statistical history *(3)* shows lumber production in the northern Rocky Mountain region for the period 1869-1936. Complete reports on stumpage and log prices have been prepared by Steer *(73)*.

Other wood-using industries are variously reported statistically; splendid summaries, for example, usually appear in the January issue of the *Pacific Pulp and Paper Industry*. All reports of this type are easily located either through the *Bulletin of the Institute of Paper Chemistry* or the TAPPI *Bibliography of Paper Making*. Bibliographies in other fields function similarly. In addition to the statistical reports mentioned above, others appear from time to time. For example, complete *Rubber Statistics* 1900-1937 *(7)* have been published in detail by the Bureau of Foreign and Domestic Commerce; also statistics on all phases of wood preservation have appeared *(33, 34)* shortly after the end of the calendar year. The price of keeping statistically abreast of progress is unceasing and untiring scanning of indexes, bibliographies, and the numerous lists which might contain such references. A typical example is the *List of Publications of the Department of Commerce (45)* which, on pages 24 and 25, refers to rather important statistics on rayon.

Governmental Publications

As publications have been classified according to major function, some governmental publications such as census reports and bibliographies have been placed with other reports of similar character. The governmental publications are so diverse and valuable that considerable time may profitably be spent in becoming acquainted with them. Due to the large number of agencies and numerous series of publications, the uninitiated may despair of ever mastering such an enormous body of literature. Among the many guides to these publications are Wilcox's *U. S. Reference Publications (83)*, Boyd's *U. S. Government Publications (11)*, and the more recent *Governmental Publications and Their Use (64)* by Schmeckebier are outstanding. Many units of the government issue complete lists of publications, which are usually revised at intervals of several years. Useful lists of this type are issued by the Bureau of Standards *(60)*, which with two supplements covers the period 1901-1936, and by the Department of Commerce *(45)* which includes publications prior to July 1937. Both may be obtained from the issuing bureau, the latter without charge. One may be kept informed of the publications of some agencies, including the Department of Agriculture, by means

of free monthly pamphlets. Any person, on request, will be placed on these mailing lists. Current publications of the Bureau of Standards are announced in its monthly *Technical News Bulletin* which may be obtained at 50 cents per year from the Superintendent of Documents, Government Printing Office, Washington, D. C. Brief descriptions of work in progress are given together with abstracts of papers in the Bureau's monthly *Journal of Research.*

The most complete list of current government publications is the *Monthly Catalog of United States Public Documents* available to individuals at $1.00 per year. Publications are listed under the issuing offices together with title, author, and price. Monthly issues have no subject index but the annual index classifies by issuing office, author, title, and subject. To a certain extent this publication functions as an index, and even more so as a bibliography of bibliographies since under the heading of "Bibliographies" many extensive lists of references are included. To supplement the *Monthly Catalog,* the most complete list issued is the *Document Catalog* prepared for each Congress which even gives fairly complete coverage of "processed" publications.

Another important list, compiled by the Library of Congress, is the *Monthly Check—List of State Publications* which includes all state publications received at the Library. This list is a valuable aid in keeping abreast of the various University and Experiment Station publications and is available to individuals at $1.50 per year from the Superintendent of Documents.

Numerous other aids are available to those who wish to be informed of government publications as they appear. By applying to the superintendent of Documents, one may be placed without charge upon the mailing list to receive the *Weekly List of Selected U. S. Government Publications,* a four-page leaflet listing titles, a brief description, and prices of the more important publications issued during the week. Although no free publications are listed, it enables one to learn of publications a few days after they are available for distribution, whereas the *Monthly Catalog* is about two months behind the month covered. Generally speaking, publications for which no charge is made may be obtained only from the issuing office, while those with listed prices may be obtained only from the Superintendent of Documents. The only free publications issued by the Superintendent of Documents are the *Weekly List,* mentioned above, and approximately 50 free price-lists of publications on various subjects. Lists nos. 43 and 46 on forestry and agricultural chemistry, respectively, are among the most useful, and list the entire stock available at the time of printing. An extensive card file is maintained by the Office of the Superintendent of Documents from which publications on specific subjects will be recommended on written request. Information on distribution of government publications and enumeration of the price lists is available, gratis, in a leaflet entitled "Information Governing Distribution of Government Publications and Price Lists by the Office of Superintendent of Documents."

To obtain publications conveniently, one may place a few dollars in a deposit account with the Superintendent of Documents. To order, it is only necessary to send in a government postcard listing the publications, whose cost will be charged against this account. This plan is extremely convenient when the exact price of a publication cannot be readily ascertained. Another method is to purchase coupons from the Superintendent of Documents in multiples of 20 at 5 cents per coupon, which are accepted in payment by either the Superintendent of Documents or for orders made directly to the issuing office. Payment may also be made by check, money order, express order, or currency. For only occasional reference, public and university libraries may be consulted. Some 450 of these are designated as "depository libraries" and are entitled to receive most government publications without charge. Due to cataloging and storage cost, however, libraries usually order only those publications for which a demand is anticipated, although specific publications will be obtained if requested.

The British publication corresponding to our *Monthly Catalog* is called *Government Publications* and may be obtained free from the British Library of Information, 270 Madison Avenue, New York, New York. This publication appears monthly and consists of a list of publications issued by His Majesty's Stationery Office during the month. The list contains the title, a brief abstract, and price. An annual cumulation is supplied. Any publication of the British Government may be obtained from this library.

Theses

While the more important theses soon found their way into periodicals and are consequently indexed, many of these may not have wide enough appeal, may be too theoretical for a practical industry or vice-versa, or may report largely negative findings of no great *immediate* importance and consequently are all too apt to be buried in the stacks. Doctoral theses may be easily located in Gilchrist's *Doctoral Dissertations Accepted by American Universities* 1937-38*(27)* (and for some earlier years in other publications of similar title by the same author and publisher), or in the *List of American Doctoral Dissertations* 1935-7 *(44)* whether they have been published or not. Gilchrist's publication of the same title in 1936 details the availability of abstracts, and cites many publications containing data on earlier theses. A third means of locating thesis material is by reading reviews and reports, especially those of a single institution or research unit in which reference is often made to valuable thesis findings. Some universities occasionally publish a list of publications, including theses, and these lists may be located in the *Monthly Check List of State Publications.*

Supplementary Information

It is often important to recognize that certain information may be outmoded or modified by later work, even though the information is of apparently more or less recent origin. This problem of time-lapse is of major importance in general textbooks although the monographs written by an authority in his field are usually much better. The latest information included may have been originally learned two to three years before the appearance of the monograph. Consider the submission of a research report: from two to five months usually elapse before it appears in an index, and at least six months to a year or so is apt to elapse from the time the monograph author lastly consults the indexes and periodicals until the monograph can be supplied by the publisher. Sometimes, however, especially for one who keeps

abreast of a wide field, some delay is justified by the splendid practice of some indexes of having only an authority on the subject prepare an abstract, since it might be termed a sort of "predigestion" and makes covering a large number of indexes easier and more reliable. Time-lag is especially noticeable in statistical reports, the *Census of Manufactures*, for example, requiring two years of preparation. Obviously, time-lapse occurs in all publications: least in periodicals, more in indexes, and may be from considerable in monographs to extreme in texts and similar sources. As the individual has no control over time-lag, recognition should be emphasized.

Library Services

This heyday of specialization and the concomitant necessity of exhausting all known information on a narrow subject before expending time and material on experiment has furrowed many a scientific brow in the attempt to obtain a periodical not available locally. The problem is especially acute in the field of wood since so many converging sciences, industries, and trades participate in its use. A common solution is that of using the interlibrary loan service. Most of the 255 libraries in the *Chemical Abstracts* "List of Periodicals Abstracted" cooperate in this service, loaning for two or three weeks upon payment of transportation. In this same list, those libraries are designated which furnish translations. A typical translation charge, made by the United States Patent Office library, is 75 cents per 100 words.

What is undoubtedly a more significant development in library service is the use of microfilm, now familiar, in principle at least, to all consistent library users. This service is well developed and available in the extensive library of the Department of Agriculture at Washington, the Library of Congress, and the Army Medical Library. Upon special request, material from other Washington libraries can be copied. A few other libraries are equipped to prepare microfilm and many have the projection equipment. A magnifying device permitting reading directly from the film is also available. For the preparation of microfilms a charge of one cent per page plus a service charge of 20 cents per order is made. Microfilms thus permit access to old material which libraries refuse to loan, the cost is generally less than for photostats, copies may be made, and a permanent record is available to all of the scientific literature in existence.

Conclusion

Since the above is intended merely as a guide to literature, lengthy descriptions have been deliberately omitted in the conviction that only actual use will convey familiarity. While in a paper of this length it is impossible to detail the methods of finding information, it is hoped that the classification, references to publications, and especially those references dealing with searching methods in allied fields will help to overcome this disadvantage. The enormous amount of scientific and technical literature available today is so great that few people realize the full potentialities of its effective use. It might well be said that libraries are one of our most important institutions; who among us can not broaden his horizon and increase his effectiveness by frequent reference to the written word?

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New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Samuel I. Aronovsky, acting chief, Agricultural Byproducts Laboratory, U. S. Dept. Agriculture, Ames, Iowa. Dr. Aronovsky is a graduate of the University of Minnesota and was formerly Chief Chemist of Northwest Paper Company, Cloquet, Minn.

Philip N. Bower, junior engineer, Scott Paper Company, Chester, Pa., is a graduate of the University of Maine.

Silvio Gagliardi, managing director of Celulosa Argentina, S. A., Juan Ortiz FCSF, Argentine Republic is a 1926 graduate in industrial engineering of the University of Buenos Aires.

Waldo J. Chastant, assistant chemist, Southern Kraft Corporation, Springhill, La. is a 1938 graduate of Louisiana State University in chemical engineering.

Claud B. Christiansen, kraft mill chemist, Crown Zellerbach Corporation, Camas, Wash. is a 1938 graduate in chemical engineering of Oregon State College.

Alfred H. Croup, assistant physicist, Hammermill Paper Company, Erie, Pa. is a 1921 graduate of Pennsylvania State College and received his Ph. D. from the University of Pittsburgh in 1931.

Joseph Edwards, research chemist, Price Brothers & Co., Ltd., Kenogami, Quebec, received his Ph.D. degree from McGill University in 1935.

Robert H. Faud, inspector and tester, Hankins Container Company, Cleveland, Ohio is a 1937 graduate chemist of Western Reserve University.

Harry C. Fernau, soda mill superintendent, West Virginia Pulp and Paper Company, Tyrone, Pa. attended London (England) Polytechnic (1909).

Bernard Fischlowitz, chemical engineer, Orchard Paper Company, St. Louis, Missouri is a 1926 graduate of Washington University.

Lois V. Hans, Chemist, Pettengill, Incorporated, New Hope, Pa. has been transferred from associate to active membership.

John Heasty, Instructor in Materials, Laboratory School of Industrial Design, New York, New York is a 1930 graduate of the University of Wichita.

Charles R. Huntoon, technician, Scott Paper Company, Chester, Pa. is a 1939 graduate of the University of Maine and was formerly with the Oxford Paper Company, Rumford, Maine.

Harold S. Johnson, technical superintendent, Fox River Paper Company, Appleton, Wis. attended Lawrence College and was formerly superintendent of the Lee Paper Company, Vicksbury, Mich.

Robert M. Kuhn, laboratory assistant, St. Regis Kraft Company, Tacoma, Wash. is a 1939 graduate of the University of Washington.

Charles W. E. Locke, engineer, Pacific Mills, Ltd., Ocean Falls, B. C. is a 1930 graduate of the University of British Columbia.

Harold G. Macklem, assistant to master mechanic is a 1938 graduate of the University of Maine and was formerly with the Beckett Paper Company, Hamilton, Ohio.

Leon H. Mimms, assistant to general superintendent of Coating Division, Kalamazoo Paper Company, Kalamazoo, Mich. attended the University of South Carolina and Philadelphia Textile School and was formerly with Dill & Collins, Incorporated, A. M. Collins and the Lowe Paper Company.

Clifford B. Purves, associate professor of chemistry, Massachusetts Institute of Technology is a graduate (Ph. D.) of St. Andrews (Scotland).

Paul D. Switzer, sales engineer, Heller & Merz Division, Calco Chemical Company has been transferred from associate to active membership.

George W. Verow, Jr., chemist, Brightwater Paper Company, Adams, Massachusetts is a 1938 graduate of Williams College.

George R. Wallace III, chemist, Fitchburg Paper Company, Fitchburg, Massachusetts is a 1938 graduate of Williams College.

John Willy, chemical engineer, American Reinforced Paper Company, Attleboro, Massachusetts is a 1936 graduate of Purdue University.

The Neenah Expansimeter

A Method for Measuring the Expansion or Contraction of Papers Caused by Change in Relative Humidity

By J. A. Van den Akker[1]

The property of paper to expand or contract with changing relative humidity of the surrounding atmosphere is of considerable importance in papers used in the various printing processes (particularly in color printing where accurate registration is necessary), in recording chart papers, high grade drawing papers, and in other papers which must exhibit minimum dimensional change in use. For economy of words, we may call this property *hygroexpansivity*. Over a period of many years, a number of investigators have studied this property. The methods of measurement which have been employed may be classed in three groups: Direct reading of change in length with a microscope equipped with a micrometer eyepiece or other means for measuring displacement; mechanical amplification of change in length by means of a simple lever, or drum and step-up gear; and optical amplification by means of an "optical lever."

In a recent study of hygroexpansivity carried out in cooperation with the Neenah Paper Company, a very simple but quite accurate instrument was used. Feeling that the expansimeter would be of general interest, the Neenah Paper Company has suggested that a brief description of this device be presented to the industry. A photograph of the expansimeter is shown in Fig. 1, and a schematic drawing is given in Fig. 2.

The basic principle of operation of the expansimeter is not new, although it seems not to have been employed for the measurement of dimensional changes in paper. Suspended from the lower end of the test specimen, which is cut in the form of a long strip, is a sensative spirit level vial; one end of the vial is supported by the paper specimen, and the other end is supported by a pair of sharply pointed wire feet. The test specimen is supported at its upper end by a simple micrometer arrangement. The lower end of the strip is maintained at constant elevation by means of the spirit level vial, and changes in length are measured at the upper end by means of the micrometer. The pitch of the micrometer screw and the length of specimen are chosen so that the percentage change in length may be read directly from the micrometer dial.

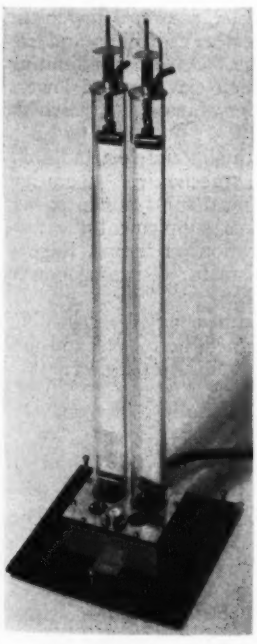

FIG. 1.

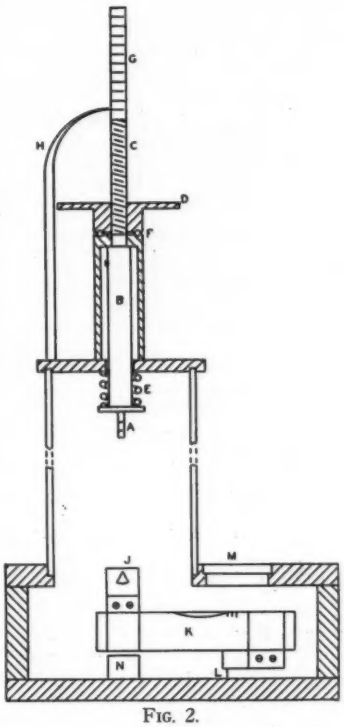

FIG. 2.

With reference to Fig. 2, the spirit level vial K is supported at one end by the wire feet L, which rest in small conical depressions in the base plate. The other end of the vial is held up by J, which links the lower clamp (the two clamps and the specimen are not shown). The block N serves only to hold up the vial when specimens are changed; the micrometer assembly at the top of the instrument may be lifted off the glass tube after rotating the threaded dial D to lower the rod B and disengage the lower clamp at J. The bubble in the vial may be observed through a circular glass window M (microscope cover glass). The upper clamp is linked at A to the rod B, which is square over the lower portion of its length to prevent rotation; the region C of this rod is threaded, and the region G is marked to enable the observer to read, with the aid of the pointer H, the integral number of revolutions of the dial D. A spring E holds the dial upon small ball bearings F, which roll between circular grooves. The readings from the dial are obtained with the help of the member H.

The portion C of the rod and the dial have 32 threads per inch. The length of specimen between the lines of clamping is 15⅝ inches, so that one-half revolution of the dial corresponds to a change in length of 0.1 per cent. The dial is graduated in twenty divisions, each division corresponding to a change in length of 0.01 per cent, so that estimation to the nearest tenth division yields a minimum estimate of change of 0.001 per cent. The sensitivity is appreciably better than this latter figure (the spirit level vials used in the present instrument have a sensitivity somewhat better than 60-second arc per division of bubble movement). Of course, the length

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of the test specimens is not restricted to 15⅝ inches, and shorter lengths may be accommodated by using simple wire links; when a shorter length is used, the observed changes must be multiplied by the appropriate factor to obtain percentage changes. The most convenient length of test specimen depends upon the nature of the micrometer screw. For example, if an ordinary micrometer caliper reading to 0.001 of an inch is employed, it would be convenient to use a test specimen length of 10 inches; percentage changes would then be readily obtained by multiplying the readings in inches by ten.

In the present instrument, a double system is used so that hygroexpansivity for the machine and cross-machine directions may be measured simultaneously. As shown in Fig. 1, the pair of glass tubes are mounted upon a common chest, which is made of brass. Air of desired relative humidity is obtained by bubbling through a saturated solution of an appropriate salt (two bottles are used in series) and is introduced by way of a tube which enters the brass chest; after passage through the tubes, the air may be returned to the salt solutions, or be simply permitted to discharge into the room. A bottle to trap droplets and a bottle containing a dew-point hygrometer are placed between the expansimeter and the humidifying bottles. The instrument is used in a constant temperature room to ensure that the air after passage through the saturated salt solutions has the proper relative humidity and to guaranty that error due to thermal expansion of the structual parts of the apparatus is altogether negligible. Error due to thermal expansion would be negligible in an ordinary room in which temperature excursions are typical, because the percentage error per degree Fahrenheit is less than 0.0005 per cent.

It is the nature of certain paper samples to equilibrate slowly after a change in relative humidity, in spite of a rate of entry of moisture to the instrument far in excess of that necessary to sustain the observed rate of change of length. Consequently, where data for many specimens must be obtained, it would be advisable to construct a cabinet containing several measuring units. If a cabinet is constructed, it would be advisable to arrange a circulating fan inside the cabinet. It would be necessary, of course, to provide a very rigid support for the micrometers, a rigid base, and rigid connection between the base and the micrometer support. The relative humidity in the cabinet may be determined by means of wet and dry bulb thermometers inserted through the wall of the cabinet at a point where the thermometer bulbs would be in the air stream from the circulating fan.

The writer would be glad to answer queries concerning specific details of the apparatus.

Hill Clutch Gets Contracts

The Hill Clutch Machine and Foundry Company, Cleveland, Ohio, during the current year has been awarded contracts for complete agitator equipment for the following concerns in the paper industry: P. H. Glatfelter Company, Spring Grove, Pa., one unit; Castanea Paper Company, Lock Haven, Pa., five units; West Virginia Pulp and Paper Company, Covington, Va., eleven units; West Virginia Pulp and Paper Company, Charleston, S. C., one unit; Champion Paper and Fibre Company, Pasadena, Texas, fourteen units; Hollingsworth & Whitney Company, Mobile, Ala., twenty-three units.

New Power Scoop Truck

The Elwell-Parker Electric Company, 4205 St. Clair Avenue, Cleveland, Ohio, has designed, engineered and developed the power operated scoop mounted on an industrial truck illustrated herewith. It is said to be one of the first units of its kind in which separate motor power is applied to the scooping mechanism as well as to the elevating and traveling operations.

The new truck is designed to handle loose materials—whether in friable condition or in sizes suitable for ready handling. Stoker coal, sulphur, nitrates, and salts are typical of the loads that can be loaded, transported, elevated and dumped by truck and a "one-man crew."

The Elwell-Parker Scoop Truck consists of a power industrial truck; a scoop of ½ to 1 yard capacity, capable of being rotated more than 100 deg.; and power mechanism for elevating and lowering the load. The design is streamlined and all vital parts are housed.

ELWELL-PARKER SCOOP TRUCK

Power plant is optional electric or gas-electric, and operating power is furnished through 3 separate standardized motors. The motors themselves, together with gear reductions and controllers, are built completely in the Elwell-Parker plant. These motors respectively propel the truck; elevate and lower the scoop and load; and operate the crowding and rotating mechanism of the scoop. A separate limiting device controls the motor which elevates and lowers the load by means of high-safety factor, double roller chains.

All motors are provided with slip clutches and limit switches which protect the mechanical operating mechanism and eliminate the need for fuses in power lines. Dynamic electric brakes supplement the mechanical foot brakes for operation on ramps. Regenerative load-lowering mechanism for returning power to the battery.

The scoop loads itself by impact and by crowding and rotary motion. It is designed, both by shape and by course of travel while scooping, to undercut the pile.

B. C. Reforests 1110 Acres

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., November 27, 1939—The British Columbia Provincial forest service has reforested 1110 acres in British Columbia this year, Hon. A. Wells Gray, minister of Lands, announced in answer to questions in the legislature. Mr. Gray said the average cost of replanting was $12.16 per acre.

Yield and Viscosity of Holocellulose and Some of Its Cellulosic Fractions*

By William G. Van Beckum[1] and George J. Ritter[2]

Abstract

Data on the yield of holocellulose, Cross and Bevan cellulose, hydrolyzed holocellulose, and their alpha celluloses together with the viscosities of these materials in cuprammonium solution reveal fundamental information of interest to pulp manufacturers.

The holocellulose gives high viscosities in spite of the fact that it contains appreciable amounts of hemicelluloses. Its high viscosity indicates that it contains longer cellulose chains than does either the Cross and Bevan cellulose or the hydrolyzed holocellulose. It also contains higher percentages of alpha cellulose of greater viscosity than does either the Cross and Bevan cellulose or the hydrolyzed holocellulose on the basis of the wood.

The alkaline treatment employed for the isolation of the alpha cellulose suggests that an alkaline treatment dissolves the short chain material and leaves as a residue the long chain material. An acid treatment, on the other hand, dissolves short chain material and also degrades the residue as is shown from the viscosity data on the hydrolyzed holocellulose and its alpha cellulose.

Cross and Bevan cellulose and its alpha cellulose have viscosities between those of the holocellulose and the hydrolyzed holocellulose which fact indicates that the action of aqueous 2.0 per cent sodium sulphite is less drastic than aqueous 1.3 per cent acid treatment on cellulosic material.

High hemicellulosic content of a cellulosic material is not an indication of a material of low viscosity, nor is approximately the same hemicellulosic content of two cellulosic materials from the same wood an indication of similar viscosities.

In a previous report on holocellulose *(1)* it was shown that the holocellulose contains from 2.0 to 6.4 per cent more alpha cellulose than does either the Cross and Bevan cellulose or the hydrolyzed holocellulose on the basis of the wood. The greater percentage of alpha cellulose in holocellulose indicates that part of the alpha cellulose was evidently degraded to the extent of being lost during the preparation of Cross and Bevan cellulose and hydrolyzed holocellulose. It therefore seemed possible from the preceding degradative effects that the residual alpha cellulose in the Cross and Bevan cellulose and in the hydrolyzed holocellulose might have been degraded also, but not to the extent of the alpha cellulose which was lost. If these findings regarding the relative yields of the various cellulosic materials could be supplemented with data regarding the state of degradation of the materials the combined information might lead to means of improving pulp qualities as well as pulp yields. For this reason the present study on the state of degradation of holocellulose, Cross and Bevan cellulose, hydrolyzed holocellulose, and their alpha celluloses was undertaken.

Cellulosic materials are degraded during isolation and refining by the oxidation or removal of substituent groups and also by hydrolysis of the cellulose chains to shorter units. Changes affecting the substituent groups can be determined by chemical means; shortening of the cellulose chains is conveniently detected by physical measurements such as determining the viscosity of the material in some suitable dispersing medium.

If the chains of the cellulose are shortened by hydrolysis the viscosity of the dispersed material will be lowered. Accordingly an indication of the severity of degradation may be obtained by measuring the viscosity of the cellulose before and after the hydrolytic treatment. In the present study the viscosities of the materials were measured in cuprammonium solution.

Experimental

Cellulosic materials employed in the present study were prepared from 40-60 mesh wood sawdust from which the extraneous materials were previously removed. They were prepared by the following methods: holocellulose and hydrolyzed holocellulose were isolated by the methods of Van Beckum and Ritter *(2)*; Cross and Bevan cellulose was isolated by the Cross and Bevan method as modified by Ritter *(3)*; alpha cellulose was isolated by the American Chemical Society method *(4)*; lignin was determined according to the method of Barbour and Ritter *(5)*. Viscosity determinations were made according to the TAPPI standard method *(6)* except for slight increases in the concentrations of the copper and the ammonia in the cuprammonium solvent.

Some experimental difficulties were experienced in dispersing the various cellulose residues in the cuprammonium solution as specified in the TAPPI standard method *(6)*. They persisted even when the maximum concentrations of 15.2 g. of copper and 210 g. of ammonia per l. of solution as specified by TAPPI were employed. Some undispersed cellulose remained suspended in the mixture as irregularly shaped particles which were microscopically visible. An increase of the copper concentration from 15.2 to 15.5 g. and the ammonia from 210 to 215 g. per l. eliminated the dispersing difficulties. Under the modified procedure, 1.0 per cent concentrations of the various cellulosic materials were dispersed in cuprammonium, leaving only occasional cellulosic particles visible under the microscope. These findings are in disagreement with those of Farr *(7)* who found practically all the cellulose as ellipsoidal particles suspended in the cuprammonium solution. It is quite possible, of course, that the concentration of the cuprammonium and the cellulose employed here dif-

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* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Syracuse, Syracuse, N. Y., Sept. 12-14, 1939.

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[1] and [2] Member TAPPI. Student Assistant and Senior Chemist, respectively, Forest Products Laboratory, Forest Service, U. S. Dept. of Agriculture; maintained at Madison, Wis., in cooperation with the University of Wisconsin.

fered from that employed by Farr and may thus account for the difference in findings.

Results and Discussion

This study has been confined to the yield and viscosity of the various cellulosic materials. Emphasis has been centered on these two variables because of their practical significance. A summary of the yield and viscosity values is given in Table I.

The six cellulosic materials listed in Table I are divided into two classes for convenience of discussion. The holocellulose, the Cross and Bevan cellulose, and the hydrolyzed holocellulose are placed in Class 1 because they are composed of alpha cellulose and rather large percentages of hemicelulose. The alpha celluloses from the foregoing cellulosic materials are placed in Class 2.

Note: Hemicellulose as employed in this article is the material represented by the difference between the yield of the cellulosic material and its alpha cellulose.

Class 1, Cellulosic Material

Holocellulose comprises the largest percentage of cellulosic material obtainable from wood. It comprises 82.5 per cent of aspen and from 73.3 to 68.5 per cent of the five softwoods listed in the table. These yields are considerably greater than those of the Cross and Bevan cellulose and the hydrolyzed holocellulose whose yields check one another fairly closely.

In the preparation of the holocellulose alternate treatments with chlorine gas and alcoholic-monoethanolamine were used in removing the lignin from the wood. At present there is no known means for determining to what extent the holocellulose was degraded by the treatments; all that is known is that the wood was degraded to the extent of removing the lignin and leaving the white lignin-free holocellulose, which is composed of the hemicellulose and the cellulose in the wood.

The Cross and Bevan cellulose from aspen gave a yield of 64.1 per cent, which is 18.4 per cent less than the corresponding value for holocellulose; that from eastern hemlock gave a yield of 56.0 per cent, which is 12.5 per cent lower than the corresponding value for holocellulose. The Cross and Bevan celluloses from the other four woods gave yields ranging from 61.2 to 56.4 per cent and losses of cellulosic materials ranging from 12.6 to 13.4 per cent.

The hydrolyzed holocellulose yields from the various woods check fairly closely with those of the corresponding Cross and Bevan cellulose as do also the losses which occur during the isolation of the two cellulosic materials. These losses, which occur in preparing Cross and Bevan cellulose, are due to the removal of cellulosic material by dissolving the lignin chloride in hot 2.0 per cent sodium sulphite solution. The losses of cellulosic material in preparing hydrolyzed holocellulose are due to the hydrolysis of the holocellulose with hot 1.3 per cent sulphuric acid.

Holocellulose has viscosities substantially higher than those of the Cross and Bevan cellulose and the hydrolyzed holocellulose. Its viscosities are from 2½ to 3½ times higher than that of hydrolyzed holocellulose. The low viscosity of hydrolyzed holocellulose is caused by the hot acid hydrolysis received by the cellulosic material during its preparation. The Cross and Bevan cellulose viscosities are between those of the holocellulose and the hydrolyzed holocellulose. Apparently the hot 2.0 per cent sodium sulphite solution used in the preparation of the Cross and Bevan cellulose degraded the material less than the acid treatment degraded the hydrolyzed holocellulose. This finding suggests that an alkaline treatment of holocellulose would produce a cellulosic material of higher viscosity than that produced by an acid treatment.

The viscosity of the holocellulose from jack pine is 50.1 centipoises and that of the holocellulose from aspen is 40.2 centipoises. These are excellent viscosities for materials obtained in such high yields. White spruce and red spruce holocellulose also have high viscosities. The viscosities of the balsam fir and the eastern hemlock holocelluloses listed in the table are considerably lower than those of the holocellulose from the other four woods. Two possible explanations for this difference are: (1) the average length of the cellulose chains of balsam fir and eastern hemlock holocelluloses is shorter than that of the holocellulose from the other four woods or (2) a low percentage of extremely long cellulose chains in the holocellulose from aspen, white spruce, red spruce, and jack pine might affect the viscosity to a greater extent than the proportion of the long chain material would indicate.

Large proportions of hemicelluloses in a cellulosic material are not necessarily indicative of a material of low viscosity. This conclusion is based on the fact that aspen holocellulose has a hemicellulose content of 31.8 per cent and a viscosity of 40.2 centipoises whereas aspen Cross and Bevan cellulose has a hemicellulose content of 24.5 per cent and a viscosity of 28.9 centipoises, and the aspen hydrolyzed holocellulose has a hemicellulose content of 26 per cent and a viscosity of only 11.2 centipoises. Moreover, the same wood may have two materials with approximately the same hemicellulose content yet their viscosities may be unequal. As an illustration, the hemicellulosic content of Cross and Bevan cellulose and the hydrolyzed holocellulose from balsam fir is 29.6 and 28.9 per cent, respectively, while their corresponding viscosities are 19.7 and 6.4 centipoises.

It would be of interest to compare the yields and viscosities of bleached commercial pulps with the preceding data. A comprehensive comparison would, however, lead too far afield from the prime objective of this study because of the fact that both the yields

TABLE I.—YIELD AND VISCOSITY OF CELLULOSIC MATERIALS FROM VARIOUS WOODS

Cellulosic materials	Aspen		White spruce		Red spruce		Jack pine		Balsam fir		Eastern hemlock	
	Yield	Viscosity	Yield	Viscosity	Yield	Viscosity	Yield	Viscosity	Yield	Viscosity	Yield	Viscosity
Holocellulose	82.5	40.2	73.3	32.7	72.9	35.4	72.5	50.1	69.9	20.1	68.5	23.0
Cross and Bevan cellulose	64.1	28.9	61.2	17.2	60.3	18.8	58.3	26.9	56.4	19.7	56.0	20.3
Hydrolyzed holocellulose	63.7	11.2	61.0	13.7	60.5	11.6	59.1	15.8	55.3	6.4	55.4	8.5
Alpha from holocellulose	50.7	72.3	49.5	68.2	48.3	56.7	49.5	77.7	44.0	39.2	48.2	36.1
Alpha from Cross and Bevan cellulose	48.3	39.6	44.6	23.8	43.4	30.1	43.2	29.2	39.8	24.0	43.2	23.5
Alpha from hydrolyzed holocellulose	47.3	18.0	43.7	21.1	43.3	18.4	43.1	21.1	39.3	19.3	41.7	20.9

Note: Percentage yield based on weight of oven-dry wood; viscosities expressed in centipoises in cuprammonium solution.

and viscosities of the commercial pulps vary so appreciably. For this reason viscosity measurements were made on only two bleached sulphite pulps, aspen and spruce, for comparison. The yield of the bleached aspen sulphite pulp was unavailable. It could hardly have exceeded 43 per cent, however. The viscosity of the pulp was 19.2 centipoises and the alpha cellulose content was 36.7 per cent on the basis of the wood. The viscosity of this pulp compares favorably with that of the holocelluloses from balsam fir and eastern hemlock, but its yield is far below that of the holocelluloses. The yield of the bleached white spruce sulphite pulp was 41.0 per cent. The viscosity was 46.0 centipoises and the alpha cellulose content was 34.8 per cent on the basis of the wood. The viscosity of the pulp compares favorably with that of the holocelluloses from aspen and jack pine but the yield is also far below that of the holocelluloses.

Class 2, Alpha Celluloses

The alpha celluloses have received the same chemical treatments as the cellulosic materials from which they were isolated and in addition they have been treated at 20 deg. C. with 17.5 per cent sodium hydroxide solution and 10.0 per cent acetic acid solution. The two additional treatments removed the hemicellulose. At present there is no test for the additive degradation effect of the two additional treatments on the residual alpha cellulose.

The most impressive observation made in connection with the data on the alpha celluloses is the high yield that accompanies the high viscosity. Viscosities of the alpha celluloses obtained from the different holocelluloses range from jack pine, which has a viscosity of 77.7 centipoises, to eastern hemlock, which has a viscosity of 36.1 centipoises. All these values are high compared with those for alpha celluloses obtained from the other two cellulosic materials.

Viscosities of the alpha ceululose from hydrolyzed holocellulose from the six woods are fairly uniform ranging from 18.0 centipoises in aspen to 21.1 centipoises in white spruce. The uniformity in viscosity indicates unformity in the average chain length among the alphas from the six hydrolyzed holocelluloses. The viscosity data of this material indicate that its average chain length is less than that of alpha cellulose from the other two sources.

The viscosity of the alpha cellulose from the aspen bleached sulphite pulp mentioned previously is 21.0 centipoises, which is much lower than that of the alpha cellulose from the holocelluloses and the yield, which is 34.6 per cent, is also much lower than that of the alpha cellulose from the holocelluloses. The viscosity of the alpha cellulose from the white spruce sulphite pulp also mentioned previously is 49.0 centipoises. This value is considerably higher than the viscosities of the alpha celluloses from balsam fir and eastern hemlock holocelluloses but considerably lower than the viscosities of the alpha celluloses from the other four holocelluloses. The yield, which is 34.0 per cent, is also much lower than that of the alpha celluloses from the holocelluloses.

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(2) Van Beckum, W. G. and Ritter, Geo. J. *Paper Trade J.* 105(18): 127-30 (1937).
(3) Ritter, Geo. J. *Ind. Eng. Chem.* 16:947 (1924).
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(5) Ritter, Geo. J. and Barbour, J. H. *Ind. Eng. Chem., Anal. ed.* 7:238 (1935).
(6) TAPPI Tentative Official Standard Method. *Paper Trade J.* 94 (19):38-39 (1932). Official Standard, April 15, 1933. Revised April 15, 1935. Corrected Dec. 15, 1937. T 206 m-37.
(7) Farr, W. K. *J. of Phys. Chem.*, 42, no. 8:1113-23 (1938).

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C., for 10 cents each. Send currency, not stamps.

Alkaline Process

Alkaline Pulping Process. Biagio Porrino, Ido Mutti and Ilario Fazzioli. Fr. pat. 832,647 (Sept. 29, 1938).—Shive of hemp and linen is used for the production of cellulose particularly suitable for the production of rayon, explosives, etc. The shive is heated under pressure to 140° to 145°C. in a solution of sodium hydroxide containing a small amount of sodium sulphide.—A.P.-C.

Treatment of Bast Fiber Shives. B. Porrino, I. Mutti and I. Fazzioli. Brit. pat. 496,015 (Jan. 25, 1938).—Bast fiber shives (of hemp or flax) containing the whole of the woody material are treated at 140 deg to 145 deg. C. under 5 to 6 atmospheres with aqueous sodium hydroxide (2 to 2.5 per cent) containing a small proportion of sodium sulphide, and are then bleached in two stages with intermediate further sodium hydroxide treatment. The resulting cellulose is suitable for the manufacture of rayon, explosives, wadding, etc.—A.P.-C.

Methods of Recovering Heat and Chemicals from Black Liquor. Alfred G. Kernin, assignor of 60 per cent to The Babcock & Wilcox Company and 40 per cent to The Canada Paper Co. U. S. pat. 2,138,278 (Nov. 29, 1938).—A self-sustaining process for the recovery of chemicals and heat in a horizontal type of recovery furnace from concentrated waste liquor comprises spraying the liquor in coarse particle form in a general upward direction into a stream of heated combustion gases flowing in a generally horizontal direction, causing the sprayed liquor particles to impinge against an extended boiler surface constituting a ceiling above the stream of gases with sufficient pressure to adhere thereto to be dried thereon, whereby the liquor is dehydrated and organic matter therein largely volatilized to form charred residues which fall from the surface to build up a bed therebeneath, supplying a limited amount of air to the bed partially to burn organic combustibles therein to form incompletely burned gases, and supplying additional air to complete the burning of the gases while the gases are passing in a generally horizontal direction beneath the ceiling to provide the heated gases of combustion mentioned. An apparatus is described.—A.P.-C.

Mechanical Process

Process for the Manufacture of Ground Wood. A. Wohl, Danzig Langfuhr. Ger. pat. 656,505 (March 29, 1935).—The wood is drenched with dilute acids in a non-oxydizing condition, then

removed and dried and defibered with or without previous storage. In this manner only a small part of the wood goes into solution, the action being on the incrustants which hold together the cellulose fibers.—J.F.O.

Grind Stone, Especially for Wood Grinding, with a Covering Consisting of Sectors of Artificial Stone. Deutsche Nortongesellschaft m. b. H. Wesseling Ger. pat. 72,525 (April 18, 1935).—The patents concerns a method of fastening the outer sectors of the grind stone.—J.F.O.

Grind Stone, Especially for Wood Grinders. Deutsche Norton Gesellschaft m.b.H., Wesseling. Ger. pat. 658,325 (Oct. 3, 1936).—Means of fastening together the sectors of the stone.—J.F.O.

Grind Stone, Especially for Wood Grinders, with a Covering Consisting of Sectors of Artificial Stone. Deutsche Norton Gesellschaft m.b.H., Wesseling. Ger. pat. 657,756 (May 15, 1936).—Means of fastening together the sectors of the stone.—J.F.O.

Artificial Pulp Grinding Stone and Method of Making Same. Hans P. Scheel, Jr. U. S. pat. 2,134,738 (Nov. 1, 1938).—The primary object of the invention is to provide a satisfactory reinforcing means and to provide a method of cracking these reinforced concrete pulp stones in predetermined locations, so that the cracks so formed will be narrow and will be spaced apart and will not damage the stone but will serve as expansion cracks and prevent the formation of other large cracks or cracks which might seriously damage the stone. This is obtained by embedding within the stone, at the time it is molded, certain bodies of materials (suitably iron bars), having a higher coefficient of expansion than the concrete.—A.P.-C.

Defibered Wood Suitable for Making Roofing, Etc. Thomas Robinson, assignor to Lancaster Processes, Inc. U. S. pat. 2,142,333 (Jan. 3, 1939).—A method of treating wood such as that of pine stumps comprises defibering wood by subjecting a mass of small pieces of natural wood, while under pressure and in the presence of not more than a relatively small amount of water, to mechanical action which will cause the individual pieces of the wood of the mass to be rubbed one against another until the pieces are broken down into a state of elementary fibers and small fiber bundles in which the rosin ducts have been disrupted and the rosin therein is exposed on the surface of the fibers. The fibrous material so produced is treated with a solvent such as naphtha to extract the resins and similar substances.—A.P.-C.

Pulpstone. Thure Larsson, assignor to Norton Co. U. S. pat. 2,141,608 (Dec. 27, 1938).—Each segment is attached to the central core by means of a number of securing means. Each of the latter comprises an elastic bolt under initial tension, a sleeve surrounding the bolt placing it under tension, a washer at one end of the sleeve and a head beyond the sleeve which is cemented into the segment. Both the sleeve and the washer are embedded in cement. The central core has a number of key ridges extending parallel to the axis and each segment has a pronounced re-entrant groove at each end extending parallel to the axis of the stone to receive the key ridges.—A.P.-C.

Reinforced Pulp Stone. John E. Hassler. U. S. pat. 2,147,438 (Feb. 14, 1939).—Artificial pulp stones are reinforced by means of stranded wire rope, preferably arranged in a series of loops or grommets spaced laterally throughout the stone and lying in an annular course spaced inwardly from the periphery of the stone. These grommets can either be arranged in separate annular loops or may be formed of a single length formed into loops joined to the adjacent ones.—A.P.-C.

Apparatus for the Manufacture of Mechanical Pulp. A. J. A. Asplund assignor to Aktiebolaget Defribator. U. S. pat. 2,145,851 (Feb. 17, 1939).—In an apparatus in which wood chips are defibered mechanically by passing between a rotating disc and a stationary disc, defibering is effected in presence of steam under sufficiently high pressure and at sufficiently high temperature that the amount of free water produced is so small as to be substantially completely absorbed by the chips.—A.P.-C.

Miscellaneous Digesting Methods

Production of Cellulose from Vegetable Raw Materials. B. Bartfay. Brit. pat. 490,101 and 490,102 (Aug. 9, 1938).—**No. 490,101**—Wood, straw, etc., is opened up by treatment with dilute nitric acid (2 to 10 per cent) for 4 to 12 hrs. at room temperature, drained, freed from half the excess of absorbed acid by centrifuging or pressing, and heated for 1 to 3 hrs. at 60 deg. to 100 deg. C. in absence of air. **No. 490,102**—Wood, straw, etc., is opened up by treatment with aqueous nitric acid (30 to 53 per cent) at 10 deg. to 20 deg. C. The products are then washed with water in stages to recover aqueous nitric acid suitable for treatment of fresh raw materials, boiled with alkali (2 per cent sodium carbonate or hydroxide), again washed, and dried.

Production of Cellulose. Maurice O. Coeugniet. Fr. pat. 828,453 (May 18, 1938).—Lignocellulose is first treated with nitric acid and ammonia or its salts to dissolve the lignin, then boiled with a saturated solution of barium hydroxide and wetting agents and finally dehydrated. The product is suitable for the production of rayon.—A.P.-C.

Pulping Process. Société Anonima Manifattura di Altessano. Brit. pat. 496,312 (Nov. 29, 1938).—Cellulose of a high degree of purity suitable for making explosives and rayon is made from stalks and leaves of annual plants, particularly common reeds **(Arundo donax)**, and agricultural waste such as maize, by five distinct treatments. The first is acid, the second basic, the third oxidizing in an acid medium, the fourth basic and the fifth oxidizing in an alkaline medium. The first two are carried out in the presence of substances which preserve the cellulose from harmful secondary reactions, such as sugar with 5 to 6 carbon atoms.—A.P.-C.

Process for Defibering Straw, Reeds and other Dry Vegetable Matter. G. Moulaert. Belg. pat. 426,552 (March 31, 1938).—The pressed bales are saturated with preheated water in a closed chamber under reduced pressure. They are then treated with saturated steam at 150 deg. to 160 deg. C., the condensed steam being collected in a water collector in the autoclave.—A.P.-C.

Sorg Paper Co. Makes Many Improvements To Its Plant At Middletown

Many important improvements have been made during the present year in the plant of The Sorg Paper Company, Middletown, Ohio. Among the betterments completed and contemplated is a piece of equipment designed by the company for unloading bales of pulp from freight cars and tilting them on end in preparation for handling and storage by fork trucks.

New Stack Added to Power Plant

A new power stack has recently been completed and will be connected up with the boilers and put in use in the near future. This brick stack is 200 feet in height and is erected on a foundation extending 15 feet above the ground level, thus making the total height of the stack 215 feet. The outside of the stack is 18 feet at the base and 14 feet at the top. Due to the exceedingly low velocity of the gases in the stack, there will be a very small amount of fly ash escaping into the air. This feature is viewed as a contribution to cleanliness by the company and an aid in maintaining the high standards of quality of its papers. Another advantage of this modern stack will be the reduction of fuel costs by lightening the load on the induced draft fans.

The company has recently purchased a Caterpillar tractor which saves the unloading and shipping crews considerable time in the movement of cars. This machine can also be used for heavy grading work and hauling heavy equipment, which means a saving of time to the maintenance departments of the company.

Save-Alls and Special Mixing Equipment

A recent installation of new equipment includes modern save-alls on two machines, which has enabled the company to reduce the shrinkage on these machines. It is believed that good control is now provided against fiber loss on all the machines. The effluent from the plant has been constantly reduced as the company has continued every effort to reduce stream pollution to the lowest possible point.

Through the installation of special starch handling equipment, which includes mixing and storage tanks, the cost of labor in handling this material has been reduced and has resulted in a material improvement in the quality of paper.

The completion of certain chlorination equipment has provided definite control over the bacteria count for certain papers manufactured for food containers.

In the machine shop additional equipment has been installed which enables the company to take care of most of its own shop work and so reducing the time machines remain idle through shut down operations,

PLANT OF SORG PAPER CO. WHERE IMPORTANT IMPROVEMENTS ARE BEING MADE.

and reduces machine shop expense done outside the plant.

Verigraph Moisture Control Installed

On one of the company's white paper machines verigraph moisture control equipment has been installed to more perfectly control the manufacture of printing papers. A new temperature control equipment for another machine has been ordered and the company contemplates the additions of temperature and moisture control equipment for several other machines.

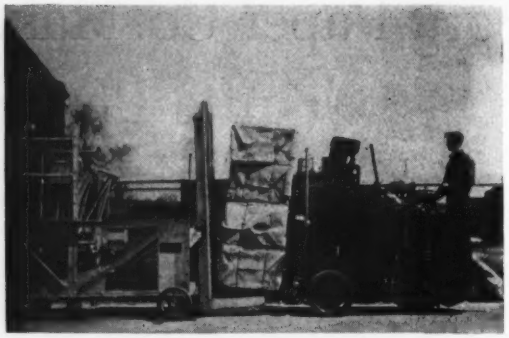
New Equipment for Handling Raw Materials

During the present year installation of a great variety of new equipment has been made to reduce the cost of handling pulp and other raw materials. Because of particular conditions in the company's mills and warehouses, it was necessary to make this equipment of special design to meet the special requirements. The company has purchased three tilting and tiering fork-lift trucks, with lateral movement of the forks, for the handling of all pulp unloaded into storage and destacked from storage and made available for use in the beater rooms. All of this pulp is now handled in loads of from 1,500 to 2,000 pounds, from the time it is unloaded until it is deposited beside the beater ready to be furnished.

To assure an abundant water supply a new deep well has been driven. Warehouse capacity has also been enlarged to provide ample space for the increased pulp inventory now required by a fuller operating schedule of the entire plant.

Equipment Added to Kraft Paper Machine

During November, work was begun on the installation of refining equipment on the company's No. 6 kraft paper machine which is believed will improve the quality of the papers turned out on this machine and increase the refining capacity. This equipment takes the place of the beaters formerly used in preparing the stock for this machine. Under the new system the stock will be pumped from the breaker beater in the basement to two thickeners located on the first floor. It will then gravitate to a thickened stock chest in the basement, from which it will be pumped to an adjacent chest which is equipped with a midfeather and connected with two refiners, through which the stocks will pass as it circulates around in this chest. When the stock has received the desired amount of treatment it will be pumped to a third chest in the basement, in which it will be thinned in



PULP HANDLING EQUIPMENT MADE BY JEFFREY MFG. CO.

order to enable it to be pumped to the machine chest. This new system will effect a labor saving and also save fuel, in addition to enabling the company to improve the quality of its paper and increase the refining capacity of the mill.

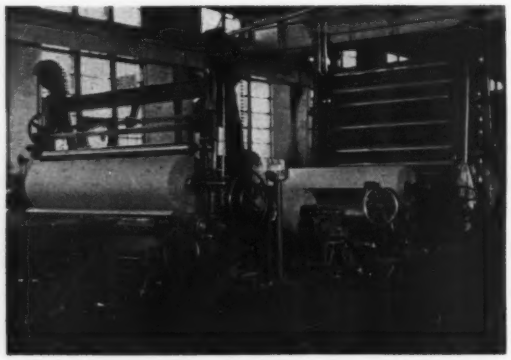
Several changes are being made on the company's No. 3 machine on which facial tissue papers are exclusively manufactured. These changes include a Ross hood for the larger dryer, which is believed will improve the quality of the papers made on this machine and to increase its productive capacity.

Following the completion of the refining equipment on the company's No. 6 machine, it is contemplated to install refining equipment on the No. 1 machine, on which both kraft and certain sulphite specialties are made. In addition to the labor and fuel savings and the increased capacity and improved quality resulting from this improvement, the company anticipate further savings in the reduction of refining equipment maintenance costs, as the beaters on the No. 1 machine have required excessive maintenance during the last few years.

Addition of Shredding Equipment

The Sorg Paper Company also is contemplating the installation of shredder or other equipment of this kind for their No. 2 machine in order to reduce beater labor expense and maintenance expense on the beaters for this machine. Also under consideration are certain changes in the waste paper plant which, when completed, will effect a saving on labor and additional economy due to the increased capacity that such changes will bring.

The company is also contemplating the purchase of modern finishing room equipment of various kinds



SHOWING CAMERON REWINDER

LOOKING INTO MACHINE ROOM OF SMITH DIVISION

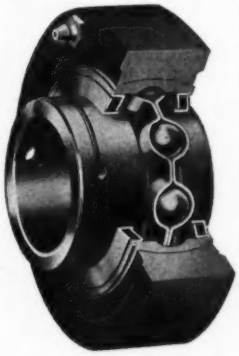
in the belief that by providing better control over the papers going through the finishing room the efficiency of this department wlil be increased.

Manufacturers of Principal Equipment

Power Plant Stack	Alphons Custodis Chimney Construction Co.
Tractor	Taylor Tractor Co.
Two Save-Alls	Bevis Machine Co.
Moisture Control Apparatus	Foxboro Instrument Co.
Temperature Control Equipment	Foxboro Instrument Co.
Special Material Handling Equipment	Jeffrey Manufacturing Co. Bevis Machine Co. United Welding Co. (These three companies built various pieces of equipment of the company's design.)
Fork Trucks	Louden Machinery Co. Automatic Transportation Co. Mercury Manufacturing Co.
Refining Equipment to Replace Beaters	Shartle Brothers Machine Co.
Paper Machine Hoods	Ross Engineering Corp.
Pumps	Nash Engineering Co.
Wells and Well Pumps	Layne Ohio Well Co.
Well Water Chlorination Equipment	Wallace & Tiernan Co.

Ball Bearing Units

Addition to the Sealmaster line of self-aligning ball bearing cartridge units, has just been announced by the Stephens-Adamson Manufacturing Company, Aurora, Ill. These patented cartridge units are provided with the company's centrifugal labyrinth seal which effectively seals bearings from all foreign materials in the atmosphere and retains lubricant.



It is pointed out by the manufacturer that mis-alignment of the shaft cannot interfere with the effectiveness of the seal, as the outer bearing race is ground on housing socket with locking radius and locked in ground nipple, which permits 2 to 4 degrees mis-alignment in any direction. Wear or glazing of felts is avoided as they are assembled without pressure. Other Sealmaster products include pillow blocks, flange and take-up units, and complete take-ups in frames.

Paper Box Men To Meet at St. Louis

The twenty-second annual convention of the National Paper Box Manufacturers Association will be held at the Coronado Hotel, St. Louis, May 19 to 22, 1940. Charles K. Shaw, Pawtucket, is president of the association. An attendance of approximately 500 is expected. The annual meetings of the Western Division, NPBMA, Edward Hager, Service Paper Box Company, St. Louis, chairman, and the National Paper Box Supplies Association will be held same time and place.

Newsprint Subject to Permit

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 29, 1939—The Danish government owing to the drastic decline of the country's net foreign exchange holdings has again made a number of articles including newsprint subject to import permit in accordance with a decree issued by the Minister of Commerce.

Photo-Electric Colorimeter

A photo-electric colorimeter, incorporating a number of distinctive features, is being announced by Dr. F. Loewenberg, 10 East 40th street, New York.

The Lumetron Colorimeter has been designed for the greatest possible flexibility and for obtaining results reproducible within the narrowest possible limits. The construction of the colorimeter allows the use of a great variety of sample holders and light filters, including monochromatic filters. As a result, the instrument covers a wide field of application, ranging from simple measurements of light transmission of liquids to colorimetric and turbidimetric chemical analysis and to abridged spectrophotometric determinations. Special provisions have been made for the accurate measurement of extremely dark and extremely transparent liquids.

For best reproducibility of readings, the design of a colorimeter must take into account the secondary influences to which photocells are susceptible. In designing the Lumetron Colorimeter, special care has been taken to eliminate errors due to optical, thermal and electrical effects and to obtain stable and linear photocell response.

The Lumetron Colorimeter uses two blocking-layer photocells in a balanced circuit. This makes it possible to operate the instrument from the power line without the use of batteries or constant-voltage transformers. Line voltage changes have no effect upon the readings obtained.

The colorimeter is made in four standard models. For general purposes, the instrument is furnished as a self-contained unit with built-in pointer galvanometer. This model is suited for broad-band color filters and for 1″ plane parallel sample holders or test tubes or microcells. Another model, designed for abridged spectrophotometric analysis, is equipped with an especially powerful light source and a highly sensitive mirror galvanometer so as to allow the use of monochromatic filters which are inherently very dark. A third model is made to accommodate sample holders up to 6″ long for accurate measurement of almost colorless liquids. The fourth model combines the monochromatic feature and the long sample holder.

The list of filters available comprises broad-band filters, tri-color filters, monochromatic filters, filters producing an overall spectral characteristic approximating that of the human eye under daylight conditions. A neutral multiplier filter is used for measuring liquids of such low transmission that the reading would come close to the zero position of the dial. Special models can be furnished with built-in range switches to spread the dial readings over any desired limited transmission range.

Financial News of Pulp and Paper Industry

Gaylord Container Reports Net Profit — Paraffine, Rayonier, American Tissue, Brompton Pulp and Paper, Scott Paper and Crown Zellerbach Declare Dividends—Champion Paper and Fibre Shows Increased Income.

New York Stock Exchange

High, Low and Last for the Week Ending November 29, 1939

	High	Low	Last
A. P. W.	2½	2½	2½
Armstrong Cork Co.	39½	38⅞	38⅞
Celotex Corp.	11⅛	10⅝	10⅝
Celotex Corp., pf.	61¾	60⅜	60½
Certain-Teed Products Corp.	7¼	6½	6⅝
Certain-Teed Products Corp., pf.	35	31¾	31¾
Champion Paper & Fibre Co.	25½	24½	24½
Champion Paper & Fibre Co., pf.	101½	101¼	101¼
Congoleum-Nairn Co.	25⅜	24⅝	25⅛
Container Corp. of America	16⅛	15¼	15¼
Continental-Diamond Fibre Co.	7¾	7⅛	7⅛
Crown-Zellerbach Co.	15¾	15⅛	15⅛
Crown-Zellerbach Co., pf.	89	87½	88¼
Flintkote Co.	22	20¾	21½
Robert Gair	4⅛	3⅝	3⅝
Robert Gair, pf.	17½	16⅛	16⅛
International Paper & Power	13⅛	12⅛	12⅛
International Paper & Power, pf.	49¾	46¾	46¾
Johns-Manville Corp.	75½	73	73
Kimberly Clark Corp.	34¼	33	33
MacAndrews & Forbes	31	30⅞	31
Masonite Corp.	40	37⅝	37⅝
Mead Corp.	11	9⅞	9⅞
Mead Corp., pf.	71½	70¾	70¾
Paraffine Companies, Inc.	45⅛	43¾	43¾
Rayonier, Inc.	16⅜	15½	16
Rayonier, Inc., pf.	26⅛	25½	26⅛
Ruberoid Co.	21	19¾	20⅛
Scott Paper Co.	48¼	48	48⅛
Scott Paper Co., pf.	114	114	114
Sutherland Paper Co.	29½	29	29
Union Bag & Paper Corp.	11½	11	11
United Paperboard Co.	6⅛	5⅜	5⅜
U. S. Gypsum Co.	83½	80½	82¼

New York Curb Exchange

High, Low and Last for the Week Ending November 29, 1939

	High	Low	Last
American Box Board Co.	8¼	8¼	8¼
Brown Co., pf.	21¼	20	21
Great Northern Paper	42½	41¼	41¼
St. Regis Paper Co.	3	2⅞	2⅞
St. Regis Paper Co., pf.	52	52	52
Taggart Corp.	4⅞	4½	4⅞

Gaylord Earns $81,375

Gaylord Container Corporation report for the September quarter a net profit of $81,375, equal after preferred dividend requirements to 2 cents each on 539,221 shares of common stock, against $112,637, or 8 cents a common share, in preceding quarter and $242,506, or 32 cents a share on common, in third quarter of 1938. Nine months to Sept. 30: Net profit, $317,904, equal to 21 cents a share, compared with $742,586, or $1 a share, last year.

Paraffine Declares Dividend

The Paraffine Companies, Inc., authorized a dividend declaration of 75 cents to holders of the common stock. Including previous payments this year of 50 cents in March, June and September, 1939 dividends amount to $2.25 a share, or 25 cents more than in 1938.

Rayonier Resumes Dividends

Rayonier, Inc., resumed the payment of dividends with the declaration of 50 cents a share on the $2 preferred stock. This is the first dividend since 50 cents was paid on July 1, 1938.

Champion Earns $405,428

Consolidated net income of the Champion Paper and Fibre Company, Hamilton, O., and its subsidiaries for the twelve weeks ended on November 12 amounted to $405,428 after all charges, including depreciation, depletion, interest and taxes. This is equivalent to 53 cents a share on the common stock, after considering the accrual for preferred dividends. In the corresponding period a year ago, the net income was $162,848, or 10 cents each on the 551,000 common shares outstanding on Nov. 6, 1938.

For the first two quarters of the fiscal year, twenty-eight weeks ended on November 12, the consolidated net income was $725,805 after the same charges. This income includes $401,756, representing the net proceeds of life insurance policies, which is nonrecurring. After accrual for preferred dividends the net income is equal to 85 cents a common share and compares with $10,946, or 14 cents each on the 77,500 preferred shares, for the twenty-eight weeks ended on Nov. 6, 1938.

The company has valued its process and finished stock inventories at the Hamilton division pursuant to a new system of grade costing, representing a change in its policy.

If such change had not been made the net income for the twelve weeks this year would have been $92,546 greater, and for the current year to date $75,056 more.

American Tissue Pays Dividend

American Tissue Mills have a dividend of accumulation of $1.75 on the 7 per cent preferred stock payable December 1 to stockholders of record November 25, leaving arrears of $24.50 a share.

Brompton Pays $1.10 Dividend

The Brompton Pulp and Paper Company, Limited, have declared a dividend of $1.10 payable December 15 to stockholders of record December 1. Dividend resumed, $1.10 paid on November 15, 1937.

Scott Votes Extra Dividend

Directors of the Scott Paper Company have declared an extra dividend of 25 cents a share and the regular quarterly dividend of 40 cents a share on the common stock.

Crown Zellerbach Votes Dividend

Crown Zellerbach has disclosed an interim dividend of 25 cents, payable January 2 to stock of record December 13, against 12½ cents paid previously.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING NOVEMBER 25, 1939

SUMMARY

Newsprint .....3,617 rolls
Printing paper .....252 rolls, 42 bls., 12 cs.
Wrapping paper .....92 bls., 4,003 rolls
Letter paper .....1 cs.
Transfer paper .....56 cs.
Grease-proof paper .....11 cs.
Miscellaneous paper .....2 cs., 222 bls., 4,026 rolls

NEWSPRINT

National Pulp & Paper Co., *Bergensfjord,* Oslo, 729 rolls.
Jay Madden Corp., *Ingrid Thorden,* Kotka, 943 rolls.
Montmorency Paper Co., *Fort Townsend,* St. Johns, 6 rolls.
Jay Madden Corp., *Cisil,* Mantyluoto, 1131 rolls.
H. G. Craig Co., Inc., *Donpaco,* Donnacona, 337 rolls.
H. Reeve Angel & Co. Inc., *Vingaren,* Kotka, 471 rolls.

PRINTING PAPER

American Express Co. *Birmania,* Trieste, 12 cs.
Jay Madden Corp., *Ingrid Thorden,* Kotka, 42 bls., 252 rolls.

WRAPPING PAPER

Alfred Bleyer & Co., *Cisil,* Mantyluoto, 22 bls., 2405 rolls.
Superior Paper Co., *Cisil,* Mantyluoto, 70 bls. 624 rolls.
L. Glickman & Co., *Cisil,* Mantyluoto, 496 rolls.
Oneida Paper Products, Inc., *Vingaren,* Gothenburg, 478 rolls.

LETTER PAPER

Pitt & Scott Co., ——, Havre, 1 cs.

TRANSFER PAPER

American Express Co., *Birmania,* Trieste, 56 cs.

GREASE-PROOF PAPER

Bleyco Paper Co., *Bergensfjord,* Drammen, 11 cs.

MISCELLANEOUS PAPER

Pitt & Scott Co., ——, Havre, 2 cs.
National Pulp & Paper Co., *Vingaren,* Gothenburg, 4023 rolls.
T. Matchett, *Vingaren,* Gothenburg, 222 rolls.
——, *Andrejs Kalnins,* Roga, 3 rolls.

RAGS, BAGGING, ETC.

Manufacturers Trust Co., *Mercier,* Antwerp, 146 bls. rags.
National City Bank, *Mercier,* Antwerp, 127 bls. rayon waste.

OLD ROPE

A. C. Whitney, *Siboney,* Tampico, 46 bls.

GLUE STOCK

Transatlantic Animal By-Products Corp., *Birmania,* Trieste, 273 pkgs.

WOOD PULP

Gottesman & Co., Inc., *Exchange,* Constanza, 1000 bls. sulphite.
Perkins Goodwin & Co., *Bergensfjord, Drammenn,* 125 lbs. bleached sulphite.
E. M. Sergeant Pulp & Chemical Co., *Bergensfjord,* Nygard, 250 bls. dry bleached sulphite, 50 tons.
Atterbury Bros., Inc., *Bergensfjord,* Oslo, 300 bls. dry mechanical pulp, 50 tons, 690 bls. dry bleached sulphite, 116 tons.
The Borregaard Co., Inc., *Bergensfjord,* Sarpaborg, 450 bls. dry bleached sulphite, 76 tons.
J. Andersen & Co., *Vingaren,* Gothenburg, 1200 bls. chemical pulp.
M. Sone, *Vingaren,* Gothenburg, 360 bls. wood pulp.
Cellulose Sales Co., Inc., *Sicilicu,* Gothenburg, 6250 bls. wood pulp.
J. Andersen & Co., *Sicilicu,* Gothenburg, 5400 bls. wood pulp.
Bulkley Dunton Pulp Co., Inc., *Sicilicu,* Gothenburg, 1500 bls. wood pulp.
M. Sone, *Andrejs Kalnins,* Riga, 88 bls. sulphite, 17 tons.

WOOD PULP BOARDS

Johaneson Wales & Sparre, Inc., *Vingaren,* Kotka, 331 rolls.
H. Fuchs & Son, *Vingaren,* Gothenburg, 43 crates.

NEWARK IMPORTS

WEEK ENDING NOVEMBER 25, 1939

Pulp Sales Corp., *Ingrid Thorden,* Viipuri, 535 bls. prime cellulose, 109 tons, 4581 bls. prime sulphite, 915 tons.

ALBANY IMPORTS

WEEK ENDING NOVEMBER 25, 1939

Parsons & Whittemore, Inc., *Andrejs Kalnins,* Tallinn/Reval, 5000 bls. wood pulp, 1009 tons.
Pagel Horton & Co., Inc., *Georgia,* Sweden, 15800 bls. wood pulp.
Pagel Horton & Co., Inc., *Oddvar,* Sweden, 4350 bls. wood pulp.
Pagel Horton & Co., Inc., *Virginia,* Sweden, 22,067 wood pulp.

PORTLAND IMPORTS

WEEK ENDING NOVEMBER 25, 1939

M. Sone, *Blankaholm,* Gothenburg, 285 bls. wood pulp.
Price & Pierce, Ltd., *Blankaholm,* ——, 1500 bls. unbleached sulphate, 2850 bls. unbleached sulphite.

BOSTON IMPORTS

WEEK ENDING NOVEMBER 25, 1939

Castle & Overton, Inc., *Andrejs Kalnins,* Tallinn/Reval, 4735 bls. dry sulphate, 790 tons.
Parsons & Whittemore, Inc., *Andrejs Kalnins,* Tallinn/Reval, 8750 bls. unbleached chemical pulp, 1763 tons.
M. Sone, *Blankaholm,* Gothenburg, 300 bls. wood pulp.
M. Sone, *Blankaholm,* Sundsvall, 500 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING NOVEMBER 25, 1939

Gottesman & Co., Inc., *Exchange,* Constanza, 1750 bls. bleached sulphite.
Price & Pierce, Ltd., *Stegeholm,* ——, 180 bls. bleached sulphite.
Price & Pierce, Ltd., *Tunaholm,* ——, 3600 bls. unbleached sulphite, 150 bls. bleached sulphate.

BALTIMORE IMPORTS

WEEK ENDING NOVEMBER 25, 1939

Jay Madden Corp., *Ingrid Thorden,* Kotka, 669 rolls newsprint.
Price & Pierce, Ltd., *Stegeholm,* ——, 210 bls. bleached sulphite.
Pagel Horton & Co., Inc., *Tunis,* Sweden, 1147 bls. wood pulp.
Pagel Horton & Co., Inc., *Delaware,* Sweden, 15,183 bls. wood pulp.
Pagel Horton & Co., Inc., *Skjoldheim,* Sweden, 16,549 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING NOVEMBER 25, 1939

Pulp Sales Corp., *Cisil,* Mantyluoto, 2136 bls. bleached sulphite, 2531 bls. strong sulphite.
——, *Cisil,* Mantyluoto, 77 rolls wrapping paper.

WILMINGTON IMPORTS

WEEK ENDING NOVEMBER 25, 1939

Price & Pierce, Ltd., *Tunaholm*, ——, 12,950 bls. unbleached sulphite, 1800 bls. bleached sulphate.

LOS ANGELES IMPORTS

WEEK ENDING NOVEMBER 25, 1939

——, *Kingsley*, Powell River, 1453 pkgs. newsprint.

Marathon Makes Improvements

The Marathon Paper Mills Company, Rothschild, Wis., is expending approximately $800,000 this year to further expansion and modernization. At the Menasha division, a new manufacturing building and an office structure are being erected at a cost of approximately $250,000. The old office building will become a machine shop and maintenance department and all of the sales and plant offices will be consolidated in the new building. Additional equipment for the manufacture of Parafilm and allied products is also being installed at Menasha, which equipment will cost about $100,000.

At the Ashland division, where paper napkins are manufactured, the company is installing new warehouse and other equipment at a cost of approximately $35,000.

At the company's Rothschild mill, a new water filtration system entailing an expenditure of about $80,000 has been installed, and a new warehouse costing approximately $15,000 is being built. New drives on some of the paper machines have been added and Vortraps and new chests installed at an expenditure of about $77,000.

Another important improvement made at the Rothschild division this year, is an increase in the capacity of the bleaching plant to produce approximately 15 per cent more bleached pulp, at a cost of $110,000. This bleaching unit will be a two-stage system, with acid wash on the chlorination stage.

Bids for Government Paper

WASHINGTON, D. C., November 29, 1930—The Government Printing Office has received the following bids for 23,400 pounds of white sulphite ledger paper: Perkins-Goodwin Company, 7.3 cents; Old Dominion Paper Company, 6.378 cents; Barton, Duer & Koch Paper Company, 6.15 cents; Mudge Paper Company, 6.93 cents; Stanford Paper Company, 6.9 cents; R. P. Andrews Paper Company, 6.93 cents; Marquette Paper Company, 6.18 cents; Aetna Paper Company, 7.67 cents; and Walker, Goulard Plehn Company, Inc., 6 cents less 2%.

For 10,000 pounds of 26 x 38" strawboard: Mathers-Lamm Paper Company, 5.3 cents; Enterprise Paper Company, 2.21 cents less 1%; R. P. Andrews Paper Company, 2.22 cents; and Barton, Duer & Koch Paper Company, 2.25 cents.

For 23,000 pounds (200,000 sheets) of 21 x 32" white sulphite ledger paper: Barton, Duer & Koch Paper Company, 8.96 cents; Import Paper Company, 7.9 cents; Stanford Paper Company, 6.9 cents; R. P. Andrews Paper Company, 6.93 cents; Mudge Paper Company, 6.93 cents; Marquette Paper Company, 6.18 cents; Aetna Paper Company, 7.27 cents; Perkins-Goodwin Company, 7.3 cents less 2%; and Walker, Goulard Plehn Company, 6 cents.

Finds No Dumping of Wood Pulp

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., November 29, 1939—Secretary of the Treasurer Morgenthau on Tuesday issued an order finding no dumping of woodpulp on the American market from foreign countries. This investigation has been under way for some months. The order which was sent to collectors of customs, appraisers, and others concerned is as follows:

"Reference is made to the notices of suspected dumping issued by the appraiser of merchandise at Seattle and the acting appraiser of merchandise at Tacoma, Wash., under the provisions of the Antidumping Act, 1921, covering importations of wood pulp from the Province of British Columbia, Canada, and to the notices of withheld appraisement issued by the appraisers of merchandise at several ports of entry in the United States covering importations of wood pulp from Canada, Germany and other foreign countries.

"After investigation and careful consideration of the evidence presented, I have reached the conclusion that findings of dumping with respect to wood pulp imported for foreign countries are not justified.

"Appraising officers who have been withholding appraisements of wood pulp from the Province of British Columbia, Canada, by virtue of the issuance of the notices of suspected dumping and appraising officers who have been withholding their appraisements of wood pulp from other provinces of Canada and from Germany and other foreign countries pending the receipt of instructions from the Department or the completion of foreign investigations are hereby authorized to make their appraisement reports without regard to any question of dumping. (Sec. 201, 42 Stat. 11; 19 U.S.C. 160.)"

Eastern Corp. Features New Wrapping

The Eastern Corporation, Bangor Me., has announced to the trade that it has developed a new water-repellent wrapping called "Hurricane Wrapping," which will be used to protect all stock shipped from its mills in the future. The company states that dousing this new wrapping with a glass of water is a most convincing way of proving the claims that it makes for it.

Hurricane wrapping is designed to protect reams of Eastco papers from severe atmospheric changes, and from exposure to inclement weather when being handled outside of stockrooms. It will be made in two colors, Mandarin and Blue, which will be used to wrap watermarked and unwatermarked papers, as in the past.

This exclusive new "Eastco" feature is being enthusiastically received, it is said, by the company's many distributors throughout the United States.

R. G. Wallace Reelected

R. G. Wallace was reelected a vice-president and director at the annual stockholders meeting of the Masonite Corporation, although Mr. Wallace's name was inadvertently omitted in the notice of the meeting which appeared in the November 2 issue of the PAPER TRADE JOURNAL.

The capacity of the mill at Laurel, Miss., should read 1,100,000 feet daily capacity, instead of for a 24-hour day.

RECORD "SELF-CLEARING" BONNETLESS VALVES FOR PAPER & PULP STOCKS (RESIDUE POCKETLESS) PATENTED

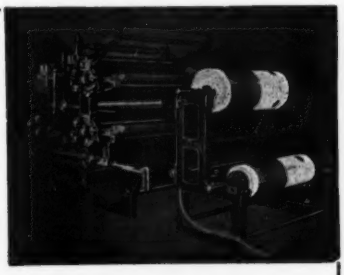
Extensively used for heavy or fibrous stocks—because the special shearing edged gate clears seat and there being "no point in lower run thru valve below outlets" no stock can lodge and restrict free flow thru valve. Gate wedge stock tight, valve closed. Valves furnished with or without renewable seats and may be rubber lined to order. Cut shows comparative operating space required by the lever and rising screw stem equipped values. Sizes to 18" lever—to 48" O.S. & Y. Lengths face to face Record standard (short) or 125 lb. wedge gate valve standard.

Manufactured by the

RECORD FOUNDRY & MACHINE COMPANY

Livermore Falls, Maine, U. S. A.

A LINE OF MACHINES YOU CAN DEPEND ON



PRINTING PRESSES

Rotary — Multi-color
Oil Ink — Arc-type
Analine — In series
Bag and Notion Envelope

EMBOSSERS

1. Glassine — 4. Tissue
2. Board — 5. Napkin
3. Towel — 6. Wrapping
7. Special Purpose

MISCELLANEOUS

Toilet Roll Wrappers
Vacuum Pumps
Seat Cover Machines
Die Inkers
Core Machines
Core Recutters

FOLDERS

Towel — Wax
Tissue — Facial Tissue
Napkin — Table Covers

WINDERS

Toilet — Crepe
Towels — Jumbo Roll

CREPE MACHINE

Tissue — Kraft
Waterproof

BUNDLING PRESSES

Adjustable — Napkin
Multi-Wall Bag

PAPER CONVERTING MACHINE CO.
GREEN BAY, WISCONSIN
Manufacturers of paper converting machinery for all purposes.

Said one converter discussing our—

Variable SPEED CLUTCH

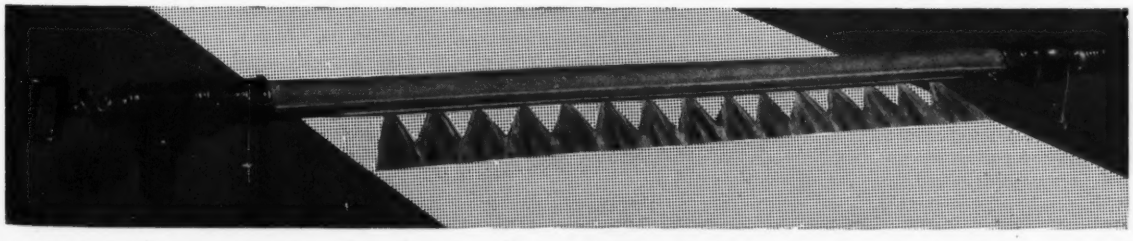
He used it to replace the slip belt drive, on a Dornbusch Embosser, by means of which the speed of the unit was varied.

"We run the machine at any speed desired. Start it slow, increase speed as required, and let it operate on long runs with clutch slipping. It does the work better than we ever expected," says this executive.

We will supply his name if desired. The clutch will solve your troubles just as it did for him.

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS

For SHOWER PIPES—*Call Headquarters!!*



Bulletin 134 **SANDUSKY FOUNDRY & MACHINE CO.** Sandusky, Ohio

Latest Review of Paper and Pulp Markets

Volume of New Orders Decline From Peak of Last Month — Paper and Paper Board Production At Capacity — Mechanical and Bleached Soda Pulp Quotations Higher—Paper Stock Prices Firm With Some Advances.

Office of the PAPER TRADE JOURNAL,
Wednesday, November 29, 1939.

Although the volume of new orders is reported as having declined from the peak reached last month, production and sales of practically all paper and paper products continues at a high level. From the reports received from many leading manufacturers' representatives, jobbers, and general paper merchants, trade is at a high level, though the paper industry is now entering the period when a seasonal slackening of activity is a normal condition prior to inventory taking later on.

This seasonal decline in general business activity is reflected in the decline in the index to 105.9 per cent for the week ended November 18, from 107.2 per cent for the previous week, compared with 93.1 per cent for the corresponding week last year.

Paper production of 130 mills for the week ended November 18 was estimated at 99.2 per cent, compared with 81.6 per cent for the like week in 1938, with 60.9 per cent in 1937, and with 89.4 per cent in 1936.

Paper board production for the week ended November 18 was 83.0 per cent, compared with 67.0 per cent for the corresponding week in 1938, with 56.0 per cent in 1937, and with 80.0 per cent in 1936.

No important change has been reported in newsprint for the current week. Consumption for the current year has been estimated as approximately 3 per cent higher than for last year. According to reliable authority, imports of newsprint from Europe for October 1939 were 11,132 tons more than for the like month last year. Imports from Canada for the same period, increased 34,890 tons, while Newfoundland shipments increased 6,280 tons. The grand total for October, 1939 was 282,580 tons, compared with 230,278 tons for October, 1938.

Imports of newsprint from Finland for October amounted to 19,414 tons, compared with 12,250 tons for the same month last year.

Sales volume in many grades of paper continues at a high level, with reports indicating that buying is now at a fairly normal rate, with a more cautious attitude reflected in the trade. In the opinion expressed in some quarters of the trade, the extent of consumer buying in the near future is doubtful, while other opinions are more optimistic and reflect the view that, taking the normal seasonal decline prior and during inventory period for granted, industry and trade is likely to become more active during the late winter months of next year. In general, factors are favorable at this time for a continuance of business at a good level, collections are reported satisfactory, and credit is reported ample for all regular business needs.

Volume continues good in the sales of most grades of paper, with some tapering off in demand reported this week. In general, sulphite papers are in excellent demand and this activity also applies to many grades of writing paper, and tissue papers. Kraft paper sales are running high.

Shipments of paper boxes has reached its peak and business in the final quarter of this year is expected to reach a new high point in volume.

Kraft liner board is at a high level and the current price of $55 per ton has been extended into next year, with the announcement of some major producers that their contract price will be $55 per ton on January 1, 1940.

Mechanical Pulp

Demand continues at a high level for mechanical pulp, with prices substantially higher. Current quotations on imported mechanical pulp, moist and dry, are at from $34 to $36 per ton, on dock, Atlantic ports. The current prices on No. 1 domestic and Canadian grades are at from $40 to $42 per ton, delivered.

Chemical Pulp

No important change in the chemical pulp market has been reported during the current week, excepting the advance in the contract price of bleached soda pulp, which is currently quoted at 2.90, delivered. Prices on all other standard grades are unchanged at prevailing market quotations. Shipments of wood pulp from Rumania have been resumed, states a late report.

Old Rope and Bagging

Trading in old rope is reported as more active during the past week and this market is currently reported as firm. The current prices which mill buyers are offering for No. 1 domestic old Manila rope is 4.00, f. o. b., New York. The old bagging market is firm, with no important changes reported this week.

Rags

Mill buying of new cotton cuttings has declined in the past two weeks and trading in old and new domestic rags is currently reported as slow. Declines are reported in No. 1 white shirt cuttings, currently quoted at from 7.75 to 8.00, and in new unbleached at the same quotations.

Old Waste Paper

The paper stock market is reported as firm, with some advances reported this week. White envelope cuttings are currently quoted at from 2.75 to 3.25; soft white extra, at from 2.50 to 2.60; crumbled No. 1 at from .70 to .75; and No. 1 mixed paper at from .52½ to .57½.

Twine

No important change has been reported in the twine market this week. Reports are current in the trade that twines made of imported fibers are likely to become relatively scarce and some further upward revision in prices may be expected if the international situation continues unfavorable.

POTDEVIN

HIGH-SPEED DRYING
of
Varnish • Gum • Lacquer
with
AUTOMATIC TEMPERATURE CONTROLLED

DRYING OVENS

Guaranteed average drying speed of 2,000 to 2,300 sheets (44"x64") per hour — automatic fed; hand fed — 1800 sheets per hour.

Fire-proof gas heat or efficient steam heat optional.

Gas, varnish, or lacquer fumes exhausted out of doors. Room temperature remains unchanged, air fresh and clean.

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TAKO FILLER CLAY

A pure Kaolin—
Opaque—

Extremely fine particle size — A clean, refined product, ALL under 10 microns—

**HOLDS IN SUSPENSION
HIGH IN RETENTION**

An unlimited supply
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THOMAS ALABAMA KAOLIN CO.
Plant at HACKLEBURG, ALABAMA

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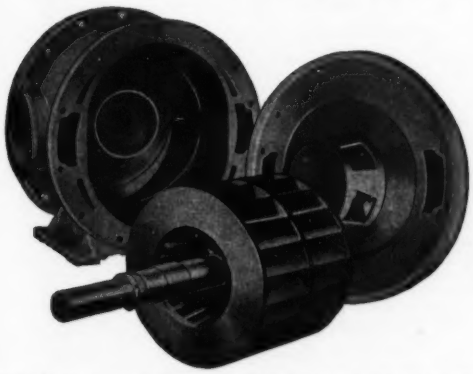
SIMPLICITY



NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

More than just a TRADE MARK

EXCELSIOR KNOX Woolen Co. Camden, Me. FELTS & JACKETS

BUT also a guarantee by men who for 75 years have prided themselves in making finer felts. TO YOU —this is the mark of dependability, longer felt life and greater saving.

KNOX WOOLEN CO.
CAMDEN, MAINE.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, November 29, 1939.

BLANC FIXE—Quotations on blanc fixe are firm under a good demand. The pulp is currently quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Prices on bleaching powder are firm under an active demand, with prices conforming to prevailing market levels. Bleaching powder is currently quoted at from $2 to $2.85 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as a little less active for this week. Standard domestic casein, 20-30 mesh, is currently quoted at 19 cents per pound; 80-100 mesh, at 19½ cents per pound. All prices in bags, car lots. Argentine casein is offered at from 14 to 14½ cents per pound. Quotations on French casein are reported nominal.

CAUSTIC SODA—Quotations on caustic soda are firm under an active demand. Solid caustic soda is currently quoted at from $2.30 to $2.40 per 100 pounds; flake and ground at from $2.70 to $2.95 per 100 pounds, in drums, at works.

CHINA CLAY—Prices on china clay continue firm under a good demand. Domestic filler clay is quoted at from $7 to $15 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $13 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine continue firm under an active demand at prevailing market prices. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported as fairly firm for the current week. Prices are a little lower on some grades. "G" gum rosin is quoted at $5.40 per 280 pounds, gross weight, in barrels, at Savannah. "FF" wood rosin is quoted at $5.15 per 280 pounds, gross weight, in barrels, New York. Seventy per cent gum rosin size is offered at $2.87 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake are firm under a heavy demand, with prices conforming to prevailing market quotations. Salt cake is quoted at from $15 to $19 per ton; chrome salt cake at $16 per ton, f.o.b. shipping point. Quotations on imported salt cake are nominal.

SODA ASH—Prices on soda ash are firm under a good demand, with quotations unchanged at prevailing market quotations. Prices on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.10; and in barrels, $1.35.

STARCH—Quotations on corn starch are unchanged at prevailing market levels. Globe pearl is currently quoted at $2.45 per 100 pounds; special paper starch at $2.55 per 100 pounds; all prices in bags, f.o.b., Chicago.

SULPHATE OF ALUMINA—Prices on sulphate of alumina are firm under a good demand. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at $1.45 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Quotations on sulphur are firm under a good demand and continue unchanged at prevailing market levels. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Prices on talc are reported firm under a good demand and conform to prevailing market levels. Domestic talc is currently quoted at from $15 to $18 per ton, Eastern mines. Imported talc is currently quoted at from $23 to $45 per ton.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	"	—
Kraft—per cwt.—Delivered Zone A			
Northern, Extra Quality	$4.87½	@	$5.50
Superstandard	4.50	"	5.00
Northern Standard Wrapping	4.25	"	4.50
Standard Wrapping	4.00	"	—
Tissues—Per Ream—Carlots			
White No. 1	.87½	@	—
White No. 1 M. G.	.85	"	—
White No. 1½	.70	"	—
White No. 2	.65	"	—
Anti-Tarnish M. G.	.75	"	—
Colored	.80	"	—
Kraft	.75	"	—
Manila	.65	"	—
Unbl. Toilet, 1 M.	3.50	"	—
Bleached Toilet	5.26	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	1.85	@	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	10.25
No. 1 Manila Wrapping, 35 lb.	5.25	"	—
No. 2 Manila Wrapping, 35 lb.	5.00	"	—
Boards, per ton—			
News	45.00	@	—
Chip	45.00	"	—
Sgl. Mla. l.l. Chip	57.50	"	—
Jute Lined Chip	57.50	"	—
White Pat. Coated	70.00	"	—
Kraft Liners	55.00	"	—
Binders Boards	76.00	"	87.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	" 36.50	32.20	" 37.75
85% Rag	....	"	29.90	" 35.00
75% Rag	23.60	" 27.75	24.75	" 29.00
65% Rag	....	"	21.65	" 26.25
50% Rag	17.55	" 21.50	18.70	" 22.75
25% Rag	14.65	" 17.75	15.80	" 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.95	@ $11.00	$10.10	@ $12.25
No. 2	8.05	" 9.75	9.25	" 11.25
No. 3	7.60	" 9.25	8.50	" 10.75
No. 4	7.30	" 9.00	8.50	" 10.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$11.90	@	$13.50
No. 2 Glossy Coated	10.35	"	11.75
No. 3 Glossy Coated	9.55	"	11.00
No. 4 Glossy Coated	9.15	"	10.50
No. 1 Antique (watermarked)	8.35	"	9.50
No. 2 Offset	7.70	"	9.00
A Grade E. F.	7.50	"	8.75
A Grade S. & S. C.	7.75	"	9.00
B Grade E. F.	6.95	"	8.00
B Grade S. & S. C.	7.20	"	8.25
C Grade E. F.	6.65	"	7.75
C Grade S. & S. C.	6.90	"	8.00
D Grade E. F.	6.40	"	7.50
D Grade S. & S. C.	6.65	"	7.75

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	$34.00	@	36.00
Dry	34.00	"	36.00
(Delivered)			
No. 1 Domestic and Canadian	40.00	@	42.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.50	@	3.00
Prime Qualities—			
Easy-Bleaching Sulphite	2.20	"	2.35
Strong Unbleached Sulphite	2.10	"	2.30
(On Dock, Atlantic Ports)			
Kraft Bleached	2.75	@	3.25
Kraft Light & Strong	1.65	"	1.80
Kraft No. 1	1.60	"	1.75
(F. o. b. Pulp Mill)			
Kraft Domestic	1.60	"	2.12½
(Delivered)			
Soda Bleached	2.90	"	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits. Also add extra freight charges and war insurance to all quotations on imported pulp.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.75	@	8.00
Silesias No. 1	5.25	"	5.50
New Unbleached	7.75	"	8.00
Blue Overall	5.50	"	5.75
Fancy	2.50	"	3.00
Washables	2.15	"	2.25
Mixed Khaki Cuttings	2.75	"	3.00
O. D. Khaki Cuttings	3.00	"	3.25

Old Rags

White, No. 1—			
Repacked	3.50	"	4.00
Miscellaneous	3.00	"	3.25
White, No. 2—			
Repacked	1.25	"	2.75
Miscellaneous	1.75	"	1.90
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.75	"	1.90
Roofing Rags—			
No. 1	1.70	"	1.80
No. 2	1.35	"	1.40
No. 3 (bagging)	1.50	"	1.60
No. 4	.60	"	.65
No. 5A	.60	"	.65

Foreign Rags

All prices nominal.

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxford	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—

HIGHEST QUALITY CLAYS

LUMP and POWDERED } IMPORTED

PAPER MAKERS IMPORTING CO. INC. EASTON, PENNSYLVANIA, U.S.A.

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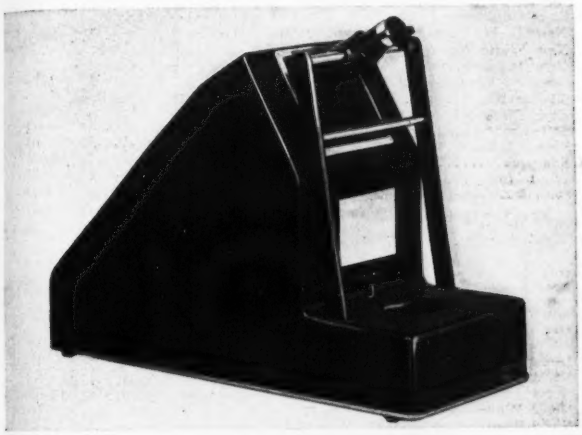

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MODEL 28

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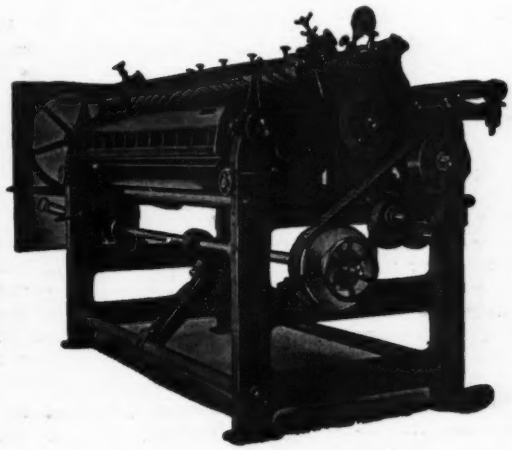

HAMBLET MACHINE CO.

LAWRENCE, MASS.

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FREDERICK Centrifugal PUMPS

CLOGLESS FOR HI-DENSITY STOCK

CENTRIFUGAL PUMPS FOR ALL PAPER MILL PURPOSES

ASH CONVEYORS——————STOKERS

THE FREDERICK IRON & STEEL CO.

FREDERICK, MARYLAND

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	"	4.75
No. 2 White Cotton.	3.25	"	3.75
No. 3 White Cotton.	2.50	"	3.00
No. 4 White Cotton.	1.90	"	2.20
Extra Light Prints..	2.00	"	2.40
Ord. Light Prints...	1.75	"	2.15
Med. Light Prints...	1.55	"	1.95
Dutch Blue Cottons.	2.25	"	2.50
French Blue Linens..	3.00	"	—
Checks and Blues...	2.00	"	—
Linsey Garments....	1.90	"	2.00
Dark Cottons.....	1.50	"	1.60
Old Shopperies.....	1.30	"	1.45
New Shopperies.....	1.45	"	1.50
French Blues.....	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.50	@	2.75
Domestic	2.25	"	2.50
Wool Tares, light...	1.75	"	2.00
Wool Tares, heavy..	1.80	"	1.90
Bright Bagging.....	2.25	"	2.50
Manila Rope—			
Foreign	3.90	"	4.15
Domestic	3.75	"	4.00
Jute Threads.....	3.00	"	3.25
Sisal Strings.....	2.00	"	2.25
Mixed Strings.....	.70	"	.85

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.75	@	3.25
Ordinary Hard White No. 1....	2.25	@	2.50
Soft White No. 1..	1.70	"	1.80
Soft White Extra..	2.50	"	2.60
Flat Stock—			
Stitchless	1.10	"	1.25
Overissue Mag....	1.00	"	1.10
Solid Flat Book...	.90	"	1.00
Crumbled No. 1...	.70	"	.75
Ledger White Stock.	1.55	"	1.65
Ledger Stock Colored	1.05	"	1.15
Manila—			
New Env. Cut....	1.70	"	1.80
New Cuttings.....	1.40	"	1.50
Old Kraft Machine—			
Compressed bales..	1.00	"	1.10
News—			
No. 1 White News	1.75	"	1.90
Strictly Overissue.	.70	"	.75
Strictly Folded....	.55	"	.60
Corrugated	.60	"	.65
No. 1 Mixed Paper..	.52½	"	.57½

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.18½	@	—
White Hemp.....	.18½	"	—
Fine Polished—			
Fine India.....	.23	"	—
Unpolished—			
Box	.14¾	"	—
Paper Makers.....	.15	"	—
Tube Rope.....	.16¼	"	—
Wall Paper.....	.15¾	"	—
Wrapping	.18	"	—
Soft Fiber Rope...	.16¼	"	—
Cotton	.21	"	—

(Hard Fiber)

Medium Java.....	.19	"	—
Mex. Sisal.....	.16	"	—
Manila	.24	"	—
Domestic	4.00	@	4.50
Sisal Rope	2.25	"	2.50
Mixed Rope.....	.75	"	1.00
Transmission Rope.	3.00	"	—
Soft Jute Rope.....	2.60	"	2.85
Jute Carpet Threads.	1.25	"	1.50
Gunny Bagging—			
Foreign	2.50	"	—
Domestic	2.10	"	2.25
Bleachery Burlap....	3.00	"	3.50
Scrap Burlap—			
Foreign	2.40	"	2.50
Domestic	1.90	"	2.00
Scrap Sisal.....	2.25	"	2.35
Scrap Sisal for Shredding	2.50	"	2.60
Wool Tares, Heavy..	2.40	"	2.50
New Burlap Cuttings	2.35	"	2.50
Aust. Wool Pouches.	3.25	"	3.50
Heavy baling bagging	2.60	"	2.65
Paper Mill Bagging..	1.25	"	1.50
No. 2 Bagging.....	1.10	"	1.25

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1...	.08	"	.08¼
New Light Flannelettes	.05	"	—
Silesias No. 1.....	.05	"	—
New Black Silesias..	.03½	"	.03¾
Soft Unbleached.....	7.50	"	8.00
Blue Cheviots.....	.05½	"	.06
Fancy	.02	"	.02½
Washable	.02	"	.02½
Cottons—According to grades—			
Blue Overalls.....	.05¼	"	.05½
New Black, soft...	.03¼	@	.04
Khaki Cuttings.....	.02½	"	.03
O. D. Khaki.....	.03	"	.03¼
Corduroy	.02¾	"	.03
New Canvas.....	.06¼	"	.07¼
B. V. D. Cuttings...	.07	"	.07½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04¼	@	—
White No. 1—			
Repacked	—	"	2.75
Miscellaneous	2.50	"	2.75
White No. 2—			
Repacked	1.90	"	2.00
Miscellaneous	2.00	"	2.25
Twos and Blues.....	2.25	"	2.50
Old Blue Overalls...	1.60	"	2.00
Thirds and Blues—			
Repacked	2.00	"	2.25
Miscellaneous	1.50	"	1.60
Black Stockings.....	4.00	"	4.25
Roofing Stock—			
No. 1.....	1.75	"	2.00
No. 2.....	1.60	"	1.65
No. 3.....	1.00	"	1.25

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....	(nominal)
Dutch Blues.....	(nominal)
New Checks and Blues	(nominal)
Old Fustians.....	(nominal)
Old Linsey Garments	(nominal)
New Silesias.....	(nominal)

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phil.)

Shirt Cuttings—			
New White No. 1.	.07¼	@	.07½
New White, No. 2.	.04	"	.04½
Light Silesias.....	—	"	.04½
Silesias, No. 1....	—	"	.04½
Black Silesias, soft	—	"	.03¾
New Unbleached..	.05½	"	.06
Washable, No. 1..	—	"	.04
Blue Overall.....	—	"	.05
Cottons—According to grades—			
Washable No. 2...	—	"	.02
New Blue.....	—	"	.02
Fancy Percales....	—	"	.03
New Black Soft...	—	"	.04
New Light Seconds	.04½	"	.05
New Dark Seconds	—	"	1.50
Khaki Cuttings—			
No. 1 O. D.....	.03½	"	.04
No. 2 Mixed.....	.03	"	.03¼
Corduroy	—	"	.02½
New Canvas.....	.05½	"	.06
New Black Mixed.	—	"	.03

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.75	"	3.00
Thirds and Blues—			
Miscellaneous	2.00	"	2.25
Repacked	2.50	"	2.75
Black Stockings (Export)	3.50	"	4.00
Roofing Stock—			
Foreign No. 1.....Nominal			
Domestic No. 1...	1.50	"	1.60
Domestic No. 2...	1.35	"	1.45
Roofing Bagging..	—	"	1.30

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign .....Nominal			
Domestic	2.50	@	3.00
Manila Rope.....	—	"	4.50
Sisal Rope.....	1.75	"	2.00
Mixed Rope.....	1.25	"	1.50
Scrap—			
No. 1.....	2.50	"	2.75
No. 2.....	—	"	1.40
Wool Tares, heavy..	3.50	"	3.70
Mixed Strings.....	.75	"	1.00
No. 1 New Light Burlap	3.00	"	3.50
New Burlap Cuttings	2.00	"	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	2.00	"	2.10
No. 1 Soft White..	1.85	"	1.90
No. 2 Soft White..	1.50	"	1.60
No. 1 Mixed.....	.90	"	1.00
Solid Ledger Stock..	1.50	"	1.60
Ledger Stock, white.	1.30	"	1.35
Ledger Stock, colored	1.00	"	1.10
No. 1 Books, heavy..	.80	"	.90
Manila Cuttings.....	1.90	"	2.00
Print Manila.....	.70	"	.75
Container Manila....	.65	"	.70
Kraft Paper.....	1.00	"	1.10
No. 1 Mixed Paper..	.55	"	—
Straw Board Chip...	.50	"	—
Binders Board Chip..	.50	"	—
Corrugated Board...	.60	"	.65
Overissue News.....	.70	"	.75
Old Newspapers.....	.65	"	.70

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White.	1.85	"	2.15
No. 2 Mixed.....	.75	"	.80
Solid Ledger Books..	1.30	"	—
Overisue Ledger Stock	1.30	"	1.50
Mixed Ledgers.....	.85	"	.90
No. 1 Books, heavy..	1.00	"	1.10
No. 1 Books, light...	.65	"	.75
Crumpled Stitchless Book Stock.....	.55	"	.65
Manila Env. Cuttings	1.70	"	1.85
Manila Envelope Cuttings, extra quality	2.35	"	2.60
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	1.10	"	1.20
Mixed Papers.....	.52½	"	.55
Print Manila.....	.70	"	.75
Container Manila....	.60	"	.70
Old Newspapers.....	.60	"	.65
Paper Wool Strings.	.80	"	.90
Overissue News.....	.70	"	.75
Box Board Chips....	.52½	"	.55
Corrugated boxes....	.60	"	.65
Kraft corrugated boxes	1.10	"	1.20
Screening Wrappers.	.60	"	.70

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	4.25	@	4.50

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots.			
No. 1 White $35.50		@	—
No. 1 Tints	36.50	"	—
No. 2 White	25.50	"	—
No. 2 Tints	26.50	"	—
No. 2 Golden Rod..	27.50	"	—
No. 3 White	21.00	"	—
No. 4 White	15.00	"	—
No. 4 Tints	16.00	"	—
No. 4 Golden Rod..	17.00	"	—
Direct mill shipment in three-ton lots.			
No. 5 White $10.50		@	—
No. 5 Tints	11.50	"	—
No. 5 Golden Rod..	12.00	"	—
No. 6 White	9.00	"	—
No. 6 Tints	9.50	"	—
No. 6 Golden Rod..	11.00	"	—
No. 7 White	8.00	"	—
No. 7 Tints	8.50	"	—
No. 7 Golden Rod..	10.00	"	—
Book—			
No. 1 M. F.	$7.00	"	—
No. 2 M. F.	6.50	"	—
No. 3 M. F.	5.35	"	—
No. 1 S. C.	7.25	"	—
No. 2 S. C.	6.75	"	—
No. 3 S. C.	5.85	"	—

Coated Book & Litho

Ton Lots (resale)

No. 1.....$12.00		@	—
No. 2.....	10.25	"	—
No. 3.....	8.90	"	—
Coated tinted.....	13.00	"	—
Wrapping—delivered—			
Rag Brown.....	4.85	"	5.25
White Wrap.....	4.00	"	—
"B" Manila.....	4.90	"	6.15
No. 1 Manila.....	$5.50	@	$6.90
Fiber	5.50	"	6.90
Kraft No. 2.....	5.50	"	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)..	46.00	"	—
Sheets	54.00	"	—

Pulp

Ground wood.....$33.00		@	36.00
Unbleached sulphite	44.00	"	—
Bleached sulphite...	54.00	"	—
Kraft	50.00	"	—
Soda	54.00	"	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.15	@	—
Soft White.....	2.00	"	2.15
White Blk. News..	1.35	"	1.50
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	"	1.00
Light and Crumpled Book Stock.	.80	"	.90
Ledgers and Writings	1.15	"	—
Manilas—			
New Manila Cut...	1.55	"	1.60
Printed Manilas...	.76	"	—
Kraft	1.15	"	—
News and Scrap—			
Strictly Overissue.	.75	"	—
Strictly Folded....	.70	"	—
No. 1 Mixed Paper..	.60	"	—

CHICAGO

Waste Paper

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope cuttings..	2.40	@	—
No. 1 Hard White.	2.23	"	—
No. 1 Soft White..	2.00	"	—
Ledger and Writings.	1.20	"	—
Solid Books.....	.95	"	—
Blanks	1.70	"	—
Krafts	1.00	"	—
New Kraft Cuts.....	1.60	"	—
Overissue News.....	.80	"	—
Old Newspapers—			
No. 1 Folded News	.73	"	—
No. 1 Mixed Paper	.63	"	—
Roofing Stocks—			
No. 1.....	1.25	@	—
No. 2.....	1.15	"	—